

Site Condition & Baseline Report Plumley

The Oil and Pipelines Agency



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Plumley PSD
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1 INTRODUCTION

1.1 Background

- 1.1.1 RPS has been commissioned by the Oil & Pipelines Agency (OPA) to prepare a Site Condition and Baseline Report required in support of a retrospective application for an Environmental Permit, covering current and future operations on their Plumley (Plumley) Petroleum Storage Depot (PSD) site. As such, this report has been prepared in accordance with regulatory guidance for [H5 Guidance for Applicants \(Ref. 1\)](#) and the European Commission Guidance ([Ref. 2](#)) concerning baseline reporting under Article 22(2) of [Directive 2010/75/EU](#) on industrial emissions (hereinafter referred to as the Industrial Emissions Directive or IED).
- 1.1.2 Paragraphs 2 to 4 of Article 22 of the IED, contain the provisions for the definitive cessation of activities involving the use, production or release of Relevant Hazardous Substances (RHS) in order to prevent and tackle potential soil and groundwater contamination from such substances. A key tool in this respect is the establishment of a 'baseline report' where an activity involves the use, production, or release of RHS and having regard to the possibility of soil and groundwater contamination. The report will form the basis for a comparison with the state of contamination upon definitive cessation of activities. Where information produced pursuant to other national or union law reflects the state at the time the report is drawn up, that information may be included in, or attached to, the baseline report
- 1.1.3 At a pre-application advice meeting on 21 October 2021, the Competent Authority (Environment Agency or EA) stated the SCR must include the Stage 1 to 3 assessments required as part of baseline reporting under the IED. Those three stages are described in [Ref. 2](#) and summarised in [Table 1.1](#).

Table 1.1 Main stages of preparing a baseline report

Stage	Activity	Objective
1.	Identify which hazardous substances are used, produced or released at the installation and produce a list of these hazardous substances.	Determine whether or not hazardous substances are used, produced or released in view of deciding on the need to prepare and submit a baseline report.
2.	Identify which of the hazardous substances from Stage 1 are relevant hazardous substances . Discard those hazardous substances that are incapable of contaminating soil or groundwater . Justify and record the decisions taken to exclude certain hazardous substances.	To restrict further consideration to only the relevant hazardous substances in view of deciding on the need to prepare and submit a baseline report.
3.	For each relevant hazardous substance brought forward from Stage 2, identify the actual possibility for soil or groundwater contamination at the site of the installation, including the probability of releases and their consequences, and taking particular account of: <ul style="list-style-type: none">- the quantities of each hazardous substance or groups of similar hazardous substances concerned;- how and where hazardous substances are stored, used and to be transported around the installation;- where they pose a risk to be released;- In case of existing installations also the measures that have been adopted to ensure that it is impossible in practice that contamination of soil or groundwater takes place.	To identify which of the relevant hazardous substances represent a potential pollution risk at the site based on the likelihood of releases of such substances occurring. For these substances, information must be included in the baseline report.

1.1.4 RPS has prepared this report based on information and data available at the time of preparation of the report.

1.2 Key Objectives

1.2.1 The key objectives of this report are to:

- Establish the environmental setting of the Plumley PSD and determine its environmental sensitivity;
- Identify activities that are currently undertaken at the Plumley PSD, including the identification of Relevant Hazardous Substances and preventative measures implemented to protect land and groundwater;
- Establish the extent of historical contamination in the soil and groundwater in areas where current and/or future processes may include similar potentially contaminating substances;
- To identify the Site Conditions at the site at the point of permit issue for the facility (baseline condition) such that they may be used as a point of reference to determine whether the site has been contaminated during the site's permitted operation in line with IED and Environmental Permitting Regulations requirements; and
- To provide conclusions on whether land quality has been impacted from historical activities.

1.2.2 With respect to the IED eight stage process described in Communication 2014/C 136/03 (EC, 2014), a summary of each stage is outlined below along with where it is addressed within this report:

- Stage 1 - Identify hazardous substances used, produced or released at the installation. This is addressed within Section 3 of this report.
- Stage 2 - Identify relevant hazardous substances used, produced or released at the installation from the list of hazardous substances identified in Stage 1. This is addressed within Section 4 of this report.
- Stage 3 – Undertake an assessment of site-specific pollution possibility for relevant hazardous substances. This is addressed within Section 5 of this report.

1.3 Current Operations on the Plumley PSD Site

1.3.1 The only operations currently undertaken on the Plumley PSD is the storage of crude oil and other petroleum hydrocarbons. The petroleum hydrocarbons are stored in 35 No. subsurface caverns (T1 to T35) that were solution mined in the underlying bedrock in the 1950's.

1.3.2 The crude oil and petroleum hydrocarbons stored in each cavern is a Light Non-Aqueous Phase Liquid (LNAPL) that floats upon brine that fills the remainder of each cavern. Product storage is a largely static, steady-state process with no active transfer pumping of the stored hydrocarbons or brine having been undertaken since the 1980s.

1.3.3 Further detail regarding hydrocarbon storage is given in *Section 2.2*.

2 SITE SETTING

2.1 Site Location

- 2.1.1 The Plumley PSD site address is Plumley Oil Storage Facility, Back Lane, Knutsford, Cheshire, WA16 9SJ. The site is located c. 2 miles east of Northwich and 10 miles southwest of Manchester, with a site centre at National Grid Reference SJ 72585 73923.
- 2.1.2 The Plumley PSD is situated in a low-lying rural area used as an active livestock farm.

2.2 Site Description

Overview

- 2.2.1 The Plumley PSD comprises 35 No. solution-mined caverns (T1 to T35) that were excavated in the 1950s. The cavern well heads are located across 80 ha of grazing land, at the positions shown on *Figure 1*.

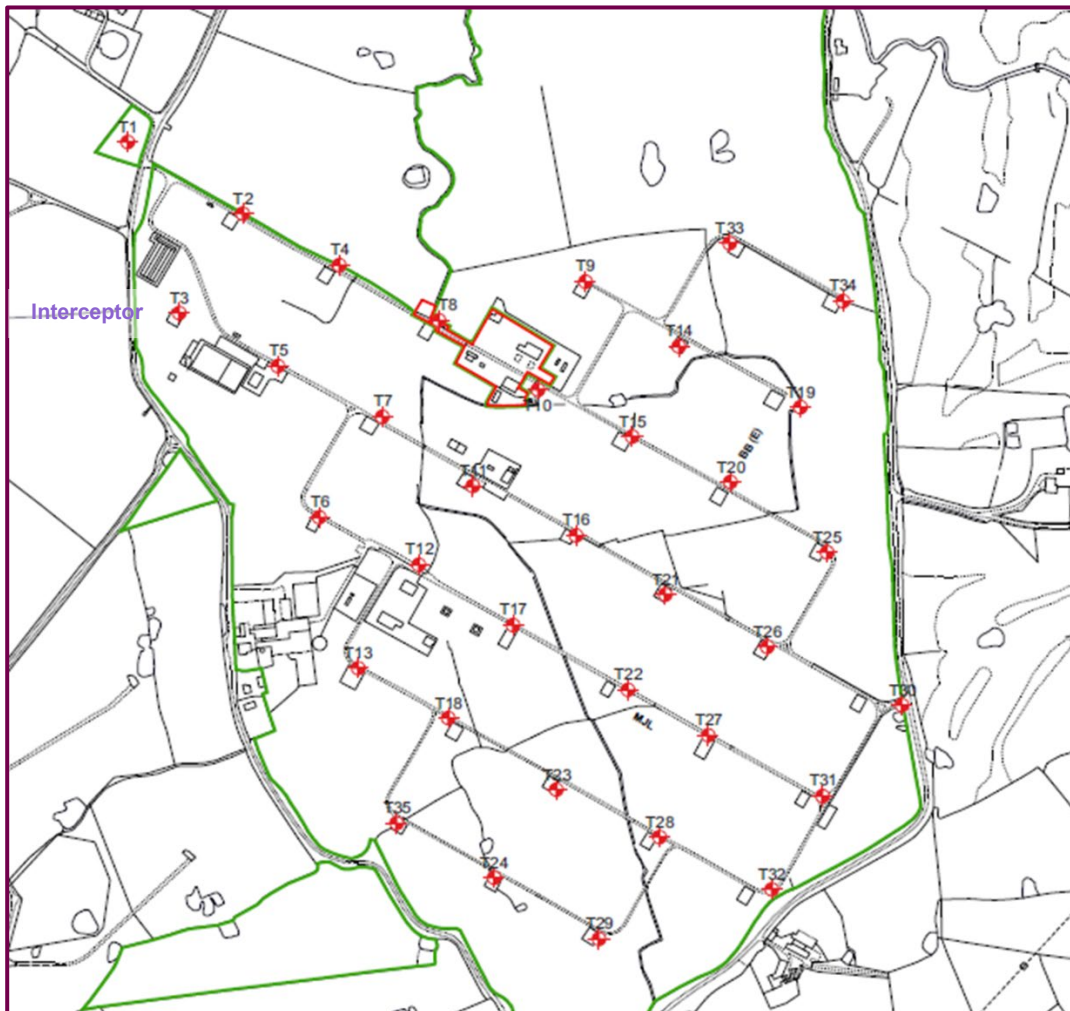


Figure 1. Storage caverns and general site plan for the PSD site

- 2.2.2 The caverns range in size from 86,000 m³ to 107,000 m³ giving a the Plumley PSD a total storage capacity of c. 3.2 million m³ (Ref. 5). The top of each cavern is typically situated a depth of

140 metres below ground level (mbgl) and 215 mbgl, with a height of c. 50m and diameter of c. 76m (Ref. 5).

2.2.3 The caverns on the Plumley PSD share a similar surface wellhead configuration that is shown in *Photograph 1* and comprises:

- An outer fence line defining the cavern wellhead area.
- A concrete-lined containment chamber accessed from the ground surface. The chamber has a volume of c. 10 m³ with a base typically located 3-4 mbgl. The chamber contains the fuel and brine pipework that would facilitate the injection or removal of hydrocarbons to or from the cavern. Under steady state storage, that pipework still contains hydrocarbons or brine. The pipework that historically provided a direct connection to the national oil distribution pipeline and subsurface brine line also enter the wellhead. As shown in *Photograph 1* these lines have been mechanically disconnected since approximately 2012.
- The concrete-lined wellhead chambers are covered by a sliding roof. A flat green sliding roof has been installed at those storage chambers that have been subject to recent scanning and testing. Where recent scanning / testing of the cavern has not been undertaken the original corrugated peaked roofs shown in *Photograph 1* are still in use.



Photograph 1. Storage Cavern T11 on the Plumley PSD

Site Drainage

2.2.4 As shown in *Photograph 1*, the wellhead chambers commonly contain water. As there are no permanent drainage lines associated with the wellheads ((Ref. 5), standing water in the chamber is periodically removed using a tractor mounted vacuum pump and discharged to the interceptor on the Plumley PSD and shown in *Plate 2*.



Photograph 2. Oil interceptor on the Plumley PSD site

- 2.2.5 Details of the Plumley PSD interceptor are provided in Ref. 5. The interceptor is located in the northwest corner of the Plumley PSD (See Figure 1) and comprises four concrete lined trenches in two banks which are approximately 4.35 m x 38 m x 2.7m. This gives a total capacity of c. 1,785 m³. Each trench can be operated independently. A bulk oil collection tank and a skimmer tank are located between each of the two banks for storing any fuel retained from the interceptor should it be present. Each interceptor channel has a slotted skimmer pipe for removing oil floating on water (if present) to a central chamber.
- 2.2.6 The interceptor discharges directly to the Peover Eye via a subsurface pipeline, although there is a control valve on the interceptor outfall which can be closed off to prevent run-off leaving the site in the event of a pollution incident (Ref. 5). In addition, there are oil in water and brine detector probes in each of the four chambers. The oil in water detector can trigger an alarm in the site office and closes a control valve on the outfall.
- 2.2.7 Currently it is considered that all site drainage including fixed piping and land drains/ditches runs through the interceptor before leaving site. The interceptor therefore receives drainage from:
- Surface runoff to land drainage ditches.
 - OPA over-pumping from wellhead areas on the Plumley PSD.
 - Over pumping of wellhead containment areas on the CoGH PSD site, via subsurface gravity drains.
 - Third-party discharge associated with the manifold areas and groundwater control activities.
 - Road drainage.
 - A subsurface stream historically present on the site.

Historical Operations

- 2.2.8 The Plumley site has been used as fuel storage depot since the 1950's. Historically the caverns were connected to the national oil distribution pipelines and mains brine line that served the site. There has been no active fuel storage / transfer utilising the subsurface distribution pipeline system on the site since 1980s. The brine line to each wellhead has been mechanically disconnected and the oil lines isolated by two valves.

Current Operations on the Plumley PSD

OPA Operations

- 2.2.9 21 of the caverns on the Plumley PSD site contain a small volume of residual hydrocarbons. The hydrocarbon type and estimated volume is summarised in *Table 2.1*. It is estimated that c. 210,000 m³ of product may remain on the Plumley PSD, although that figure will be refined with the completion of the ongoing process of underground cavern scanning / testing. The residual hydrocarbons within the caverns are dominated by crude oil, with minor quantities of petrol and other middle distillates. The remaining storage caverns are filled entirely with brine.

Table 2.1 Summary of Residual Hydrocarbons Stored on the Plumley PSD site

Cavern Reference	Estimated Volume of Hydrocarbons (m ³)	Hydrocarbon Type
T1	Negligible but not proven.	Light Distillate (Petrol)
T11	21,536	Crude Oil
T12	11,184	Crude Oil
T13	11,701	Crude Oil
T15	3,431	Crude Oil / Middle Distillate
T16	10,030	Crude Oil
T17	7,418	Crude Oil
T18	9,481	Crude Oil
T20	10,168	Crude Oil
T22	8,517	Crude Oil
T23	11,809	Crude Oil
T24	20,927	Crude Oil / Middle Distillate
T25	7,404	Crude Oil
T27	1,131	Crude Oil
T28	9,105	Crude Oil
T29	9,161	Crude Oil
T30	14,530	Middle distillate
T31	6,251	Crude Oil / Middle Distillate – 12m of Stratified Fluids
T32	10,730	Crude Oil / Middle Distillate
T33	1,171	Light Distillate
T34	14,338	Crude Oil / Middle Distillate
T35	9,538	Crude Oil
Total	209,561	

-
- 2.2.10 The hydrocarbons stored in each cavern behave as a LNAPL and therefore float upon the brine that fills the remaining volume of each cavern. The current hydrocarbon storage is a largely steady-state, static, process with no active pumping (e.g. for increased storage or transfer) of hydrocarbons or brine having been undertaken since the 1980s.
- 2.2.11 As salt within the halite beds moves naturally over time, the pressure within the cavern and associated pipework must be monitored and periodically relieved to mitigate long-term pipe integrity issues. This process can involve the removal of a small volume of oil and the addition of brine to replacement of top up the brine string, within the wellhead chamber.
- 2.2.12 The following support activities are undertaken on the Plumley to minimise the potential for accidental emissions:
- Routine monitoring of wellhead and containment area condition and integrity
 - Periodic removal of standing water in concrete wellhead chamber using a vacuum pump system powered by a tractor mounted Power Take Off (PTO).
 - Routine pressure monitoring within the caverns.

Third Party Operations

- 2.2.13 The following 2 No. operators manage the active fuel distribution pipelines on the Plumley PSD site:
- Manchester Jetline Ltd:
 - Operate aviation fuel/jet line, from Stanlow refinery to Manchester Airport via c. 40 miles of 10" subsurface pipeline.
 - Exolum (formerly CLH):
 - Also operate an aviation fuel line between the Stanlow Refinery to Backford PSD
- 2.2.14 These operators generate water via their surface water drainage system and groundwater control measures. Those waste waters are discharged directly to the Plumley interceptor.

Summary of Activities / Operations

- 2.2.15 A summary of the operations being to be considered as part of this Site Condition and Baseline Report is given in *Table 2.2*.

Table 2.2 Summary of activities undertaken on the Plumley PSD

Phase	Operation Associated Activity (Substances Involved)	Potential Cause and Consequence of Emission	Likelihood of Accidental Emission	Justification / Notes
Operational (Current)	<u>Static, steady-state, storage of hydrocarbons / product</u> 21 storage caverns principally containing crude oil with minor leaded petrol and other middle distillate storage. All storage caverns contain brine, with 14 filled only with brine.	Long-term loss of liquids stored with the cavern	Negligible	Naturally sealing behaviour of halite beds. Low permeability of halite/mudstones No evidence of adverse impacts from storage caverns in this area
		Loss from liquids from pipeline connecting cavern to wellhead due to corrosion / fracturing. Loss to surrounding geological strata	Low	Low permeability of Glacial Till / Diamicton overlying bedrock. No evidence of adverse impacts from storage caverns in this area
		Failure of wellhead valves due to excess pressure or corrosion. Loss to wellhead containment chamber.	Low	Pressure monitored. No active pumping.
	<u>Static, steady-state, storage of hydrocarbons / product</u> Cavern / pipeline pressure regulation in oil and brine pipelines that remain full. Replacement of valves on the wellheads (Crude oil, unleaded petrol, middle distillates &/or Brine)	Failure of wellhead valves / connections. Loss to wellhead containment chamber.	Low - Moderate	Small volume of brine removal
		Failure of wellhead valves / connections. Spray loss to ground outside of wellhead containment chamber.	Low - Moderate	Occurred at T175 in 2009
	<u>Static, steady-state, storage of hydrocarbons / product</u> Over-pumping of standing water in wellhead containment chambers using a tractor mounted vacuum pump. (Diesel)	Accidental release of fuel (diesel) to ground from tractor.	Low	Routine operation, using maintained equipment.

2.3 Environmental Setting

Topography & Hydrology

- 2.3.1 The Plumley PSD is situated in a low-lying area with an elevation of approximately 35 m above Ordnance Datum (m AOD). Ground level generally declines gently to the north, towards Peover Eye. The Peover Eye flows from east to west, approximately 300m north of the Plumley PSD site where it has an elevation of approximately 30m AOD. Land drains across the Plumley PSD generally drain northward and discharge to Peover Eye.
- 2.3.2 The Peover Eye Water Body forms part of the Environment Agency's (EA's) Lower Weaver operational catchment. The Peover Eye does not meet Good Ecological Status (GES) as required under the Water Framework Directive (WFD). The cause of this failure is largely attributed to agricultural and rural land management issues although some industrial and water company impacts are also suspected. There is no suggestion that deep hydrocarbon storage in this area is contributing to the failure of local river water bodies to meet GES in this area.

Geology

Regional Geological Setting

- 2.3.3 The regional geological setting has been determined from the [BGS Geology of Britain Viewer](#) and BGS 1:50,000 Map Series:
- Sheet 110: Macclesfield (solid and drift).
 - Sheet 98: Stockport (solid and drift)
- 2.3.4 The regional geological setting is summarised *Table 2.3*.
- 2.3.5 The entire area is underlain by the red mudstones and siltstones of the Sidmouth Mudstone Formation (SMF), that forms part of the Triassic Mercia Mudstone Group (MMG). The hydrocarbon storage caverns on the Plumley were excavated from the halite beds within the SMF (most notably the Northwich Halite Member).
- 2.3.6 Bedrock is capped by a veneer of unconsolidated diamicton deposits. Diamicton refers to a poorly sorted sediment, that include a significant proportion of fine-grained components (i.e. silt and clays). In some localised areas coarse, granular, glaciofluvial sands and gravels (sheet deposits) are also present above the bedrock.

Table 2.3 Regional geological sequence on the Plumley PSD

Age	Geological Unit	Description of Lithology	Thickness (m)	Hydrogeological Designation
Quaternary Superficial Deposits	Diamicton	Poorly sorted sediment with wide clast size range that is unconsolidated, presumed of a glaciogenic origin in this region	Variable	Secondary Undifferentiated
	Glaciofluvial Sheet Deposits	Unconsolidated, generally coarse-grained sand and gravel deposits of glaciofluvial origin	Variable	Secondary A
Triassic Bedrock	Sidmouth Mudstone Formation (including Northwich Halite member) of the Mercia Mudstone Group	Dominantly mudstone and siltstone, red-brown with common grey-green reduction patches and spots. Contains units of halite (up to 400m) thick at several stratigraphical levels	Up to 1600m in the Cheshire Basin	Secondary B or Unproductive Strata (Northwich Halite Member)

Grey shading denotes those geological units present in the local area that are not identified on the Plumley PSD site

Local Geology.

- 2.3.7 Details regarding the site-specific or local geological sequence has been obtained from the following sources:
- BGS geological logs appended to previous reports produced for the OPA and provided *Appendix B*
 - Geological logs for shallow boreholes installed on the Plumley PSD site in 2014 (Ref. 6) and provided in *Appendix C*.
 - The local geological description provided in the CDOIF Phase 1 Screening Assessment (Ref. 5).

2.3.8 These data sources confirm the expected geology summarised in *Table 2.3*.

Superficial Deposits

2.3.9 Local geological records do not provide a description of the superficial geology on the Plumley PSD site itself. The CDOIF Phase 1 Screening Assessment Report (Ref. 5) presents a review of BGS borehole records (ref: SJ77SW 265, 268 & 266) situated c. 350m east of the depot. That interpretation concludes the presence of 15.84m to 18.59m of Glacial Till above the bedrock. The till is described as “a sandy clay with gravel inclusions and many permeable sand and gravel lenses”. The Glacial Till becomes “becomes less fissured with depth, with groundwater encountered at varying depths suggesting the perched water within discontinuous sand and gravel lenses at depths of between 6.5m bgl and 17m bgl”.

2.3.10 Exploratory boreholes drilled on the Plumley PSD in 2014 also confirm the presence of surface till. The results of that intrusive investigation are summarised in *Table 2.4* and *Table 2.5*.

Table 2.4 Ground investigation on the Plumley PSD (Process Area) (Ref. 6)

Stratum	Characteristic Description	No. of Exploratory Holes Stratum Encountered In	Depth of Top Strata (m bgl)	Elevation of Top Strata (m AOD)	Depth of Base Strata (m bgl)	Elevation of Base Strata (m AOD)	Thickness (m)	Comments	
Process Area¹									
GLACIAL TILL	Cohesive	5	0	36.4 - 33.4	Not Proven (1.0 - 10.0)	Not Proven (35.4 - 23.4)	Not Proven (at least 1.0 - 8.7)	Soft to stiff slightly gravelly and slightly sandy to very sandy silty CLAY and clayey SILT with occasional thin lenses (<10mm) of fine and medium sand. Thickness not proven.	
		(BH-2(S) to BH-4(S) inclusive, TP-10 and TP-11)							
	Granular	Sand	3	5.7 - 6.5	27.8 - 27.4	6.5 - 7.2	27.1 - 26.7	0.2 - 1.0	Medium dense and dense slightly silty slightly gravelly to gravelly SAND. Sand is coarse. Encountered as a sand layer between 0.2 – 1.0 m in thickness in BH-2, BH3 and BH-4.
			(BH-2(S), BH-3 and BH-4(S))						
		(BH-3)	7.50	26.8	7.60	26.7	0.1	Secondary deeper sand layer encountered in BH-3 only.	
	Gravel	1	7.30	26.1	8.30	25.1	1.0	Dense slightly silty clayey sandy GRAVEL. Gravel is angular to sub rounded fine to coarse of quartz and flint. Gravel layer recorded in BH-4(S) only.	
		(BH-4(S))							

Table 2.5 Ground investigation on the Plumley PSD (Outside of Process Area) (Ref. 6)

Stratum	Characteristic Description	No. of Exploratory Holes Stratum Encountered In	Depth of Top Strata (m bgl)	Elevation of Top Strata (m AOD)	Depth of Base Strata (m bgl)	Elevation of Base Strata (m AOD)	Thickness (m)	Comments
Outside Process Area								
TOPSOIL	Cohesive	2 (TP-4 & TP-6)	0	34.6 - 30.5	0.40 - 0.70	34.2 - 29.8	0.4 - 0.7	Firm slightly gravelly very sandy clayey SILT. Maximum thickness of 0.7 m recorded in TP-3.
	Granular	5 (BH-1, TP-3, TP-7- TP-9 inclusive)	0	36.7 - 30.2	0.20 - 0.70	36.1 - 30.0	0.2 - 0.7	Silty to very silty clayey to very clayey SAND with occasional frequent rootlets. Sand is fine to coarse.
MADE GROUND	Granular	1 (TP-5)	0	33.1	0.2	32.9	0.2	Slightly sandy GRAVEL. Gravel is angular and sub-angular fine to coarse of sandstone, flint and clinker. Recorded in TP-5 only.
GLACIAL TILL	Cohesive	8 (BH-1, TP-3 to TP-9 inclusive)	0.2 - 0.7	36.1 - 29.8	Not proven (2.0 - 3.5)	Not Proven (34.7 - 26.7)	Not Proven (at least 1.3 - 3.3)	Very soft to firm very sandy clayey SILT and slightly sandy slightly gravelly silty CLAY. Thickness not proven.
	Granular	2 (BH-1 & TP-4)	1.0 - 3.50	33.6 - 26.7	1.2 (at least 4.0)	33.4 - at least 26.2	0.2 (at least 0.5 in BH-1)	Medium dense slightly silty to silty clayey SAND. Sand is coarse. Sand layer recorded in TP-4 and BH-1 only. Not proven in BH-1.

2.3.11 Based on the results of this ground investigation the following was concluded:

“The ground conditions encountered during the ground investigation works generally reflect the BGS and third-party ground information. Ground conditions encountered comprised topsoil (with the exception of the proposed process area which had been subject to topsoil strip) overlying superficial glacial deposits of Glacial Till (cohesive deposits interbedded with granular layers between 0.1 – 1.0 m in thickness). Made ground was encountered localised to one location at TP-5 (0.2 m in thickness)” (Ref. 6)”

Bedrock Geology

2.3.12 Triassic bedrock of the SMF, including the Northwich Halite member, was not encountered during the intrusive investigation undertaken on the Plumley PSD.

2.3.13 BGS logs confirm a deep sequence of the Mercia Mudstone Group, comprising mudstones and marls, with halite units and occasional sandy horizons, beneath the superficial Glacial Till deposits. Table 4.12 in the CDOIF Phase 1 Screening Assessment Report (Ref. 5) identifies the following sequence beneath the near surface Glacial Till:

- Red and grey marl to a depth of 132 m to 145 m – Interpreted to be the upper layers of the Northwich Halite that have had salt leached out (the dry rockhead).
- Salt or salt with marl to a depth of 305 m to 329 m – Interpreted to be the Northwich Halite that the caverns have been excavated in.
- Marl and salt to borehole base at depths of 311 m to 365 m

Hydrogeology

General Designations

- 2.3.14 The bedrock of the SMF is classified a Secondary Undifferentiated aquifer unit. The Northwich Halite member, that forms part of the SMF, is classified unproductive strata. These classifications are consistent with the low permeability expected for the mudstones and halite units within the Mercia Mudstone Group. Groundwater is not therefore considered significant with respect to the bedrock underlying the site.
- 2.3.15 The Diamicton / Glacial Till overlying the bedrock is classified a secondary undifferentiated aquifer unit. This reflects its largely cohesive nature and low permeability and storage capacity. Groundwater is not considered likely to be significant in these deposits. The localised presence of groundwater may occur in thin granular (sand or gravel) layers present in the Glacial Till. However, these water bearing units are not typically laterally extensive so do not generally represent a significant groundwater resource.
- 2.3.16 As shown on the borehole logs in *Appendix C* and summarised in *Table 2.4* and *Table 2.5*, two of the boreholes installed on the Plumley PSD in 2014 (Ref. 6) did intercept groundwater bearing granular horizons in the Glacial Till at a depth of below mbGL. These deposits are considered to represent sand and gravel lenses within the Glacial Till that do not appear to constitute a laterally extensive groundwater bearing aquifer unit. Shallower sand horizons were also identified at two locations, although they did not yield significant water strikes.
- 2.3.17 Consistent with the local geology and hydrogeology, no Source Protection Zones (SPZs) are defined in the vicinity of Plumley PSD. Nor is the Plumley PSD in a Drinking Water Safeguarded Zone (Groundwater or Surface Water) or Nitrate Vulnerable Zone.
- 2.3.18 The Plumley PSD is situated within the Weaver and Dane Quaternary Sand and Gravel Aquifers Water Body, defined for the WFD. Although this WFD groundwater body covers the entire area, it relates to the coarse grained, localised Glaciofluvial Sheet Deposits as opposed to the Glacial Till / Diamicton. That waterbody is classified as having an overall WFD status of Poor in 2019. This classification relates to its chemical status. The reason for not achieving good status (RNAG) largely relates to poor nutrient management in relation to agriculture and rural land management practices.

Groundwater Abstraction

- 2.3.19 The envirocheck land report obtained for the CDOIF Phase 1 Screening Assessment Report (Ref. 5) is provided in *Appendix D* and states that:
- “The only abstraction located in the immediate vicinity of the PSD is registered to Mr. R Williamson of the Grange Plumley for spray irrigation purposes, which appears to abstract from the section of the Peover Eye that lies immediately to the north of Plumley PSD. This is a commercial abstraction and is not classified as a receptor under the CDOIF guidance.”*
- 2.3.20 Cheshire East Council was also consulted with regards to abstraction and the following private water supply abstractions were also identified within a 10 km radius of the Plumley PSD:
- Dairy House Farm, Chester Road, Over Tabley. Cheshire, WA16 0PN, grid reference 372392, 379538 (6.1km north) Spring supply, in use for commercial purposes
 - Kermincham Hall, Forty Acre Lane, Swettenham, Cheshire, CW4 8DX, grid reference 379530, 367922 (9.97km south-east), spring supply of an unstated purpose.
 - Brook Farm, Forty Acre Lane, Kermincham, Cheshire, CW12 2LJ, grid reference 379737,367573 (10.3km south-east), well supply used for commercial purposes.
- 2.3.21 Although it cannot be discounted that there may be other private abstractions in the area, the general absence of private abstractions is consistent with the expected hydrogeology and aquifer characteristics in the vicinity of the Plumley PSD site.

Groundwater Occurrence

2.3.22 Groundwater was encountered in boreholes drilled on the Plumley Site in 2014, as summarised in *Table 2.6*.

Table 2.6 Summary of groundwater occurrence on the Plumley PSD site (Ref. 6)

Exploratory Location	Encountered Depth (m bgl)	Strata	Observed Water
BH-1	0.9 (29.3 m AOD)	Glacial Till	No – damp
BH-2(S)	5.0 (28.7 m AOD)	Glacial Till	Yes – evident within core liner
BH-4(S)	6.0 (27.4 m AOD)	Glacial Till	Yes – evident within core liner

2.3.23 The shallow perched water encountered in borehole BH-1 was considered likely to be associated with the presence of more granular topsoil and granular Glacial Till local to this borehole location. However, the groundwater strikes within BH-2(S) and BH4-(S) at depths of 5.0 to 6.0 mbgl did correlate with the recorded presence of the sand and granular layers in both exploratory locations within the Glacial Till (Ref. 6).

2.3.24 Although water bearing, the granular layers within the deeper glacial till are unlikely to form laterally extensive groundwater units. Furthermore, the presence of overlying cohesive till suggest the recharge potential to these thin granular layers will be limited and spatially variable.

2.3.25 Given the nature of the geology expected on the Plumley PSD, shallow or deep groundwater is unlikely to be constitute a significant environmental consideration or receptor.

Environmental Sensitivity

2.3.26 A full tabulated list of designated sites is provided within 10km of the Plumley PSD is provided in Ref. 5. There are no statutory designated environmentally sensitive sites within 1 km of the Plumley PSD and only 2 sites located with 2 km of the PSD, namely:

- Plumley Lime Beds Site of Special Scientific Importance (SSSI) situated c. 1.6km northwest of Plumley PSD.
- Tabley Mere SSSI situated c. 2.1 km north of Plumley PSD

2.3.27 Other designated sites are located more than 4.5 km from the Plumley PSD. It can therefore be concluded the Plumley PSD is not situated in an environmentally sensitive location with respect to water dependent protected sites.

Summary of Environmental Receptors

2.3.28 A summary of environmental receptors relevant to the Plumley PSD and their sensitivity is summarised in *Table 2.7*.

Table 2.7 Summary of Environmental Receptors

Receptor	Description	Designation / Status	Sensitivity	Notes
Shallow Soils	Soil including unconsolidated Glacial Till / diamicton	None	Low	No designation.
Shallow Groundwater	Groundwater: Localised saturated lenses of coarse-grained material in Glacial Till / Diamicton	Secondary undifferentiated	Negligible - Low	Superficial deposits largely cohesive in nature. Laterally discontinuous, thin groundwater bearing layers, with limited recharge potential. No abstraction and not considered to form part of Weaver and Dane Quaternary Sand and Gravel Aquifers Water Body
Groundwater in Bedrock	Groundwater: Groundwater in Northwich Halite member / Sidmouth Mudstone Formation	Unproductive strata or Secondary B	Not Applicable	No significant groundwater in bedrock
Peover Eye	Surface Watercourse Peover Eye WFD River Body	No designation WFD Poor Ecological Status	Low-Moderate	Situated c. 0.3km north of the Plumley PSD
Land drainage	Surface Water	No designation	Low	Land drains cross the Plumley PSD and drain northwards to Peover Eye
Protected Sites	Not applicable	Not Applicable	Not Applicable	No designated sites close to the site (all > 1km). There a few water dependent sites with 10km of the Plumley PSD.

2.4 Soil and Groundwater Land Quality

Data Sources

2.4.1 The following data sources have been reviewed with respect to soil and groundwater quality of the Plumley Site:

- Plumley and Cape of Good Hope Petroleum Storage Depots CDOIF Phase 1 Screening Assessment report (Ref. 5) including the Envirocheck land report (2014). That Envirocheck report is provided in *Appendix D*.
- Soil and groundwater quality data was collected as part of the intrusive works undertaken on the Plumley PSD in 2014 (Ref. 6). The resulting lab data from those works is provided *Appendix E*.

Envirocheck Land Report (Landmark, 2014)

2.4.2 The historical maps confirm that that this was a largely greenfield area upon which agricultural land practices had been undertaken until the development of the caverns and fuel storage sites. No historical or active landfills or waste transfer sites are recorded in the Envirocheck report within 1 km of the Plumley Site (Landmark, 2014).

Soil and Groundwater Quality Dataset for the Plumley PSD

2.4.3 Soil and groundwater quality data was collected as part of the intrusive works undertaken on the Plumley PSD in 2014. A total of thirteen exploratory holes were advanced across the Plumley that site at the locations shown in *Figure 2*.

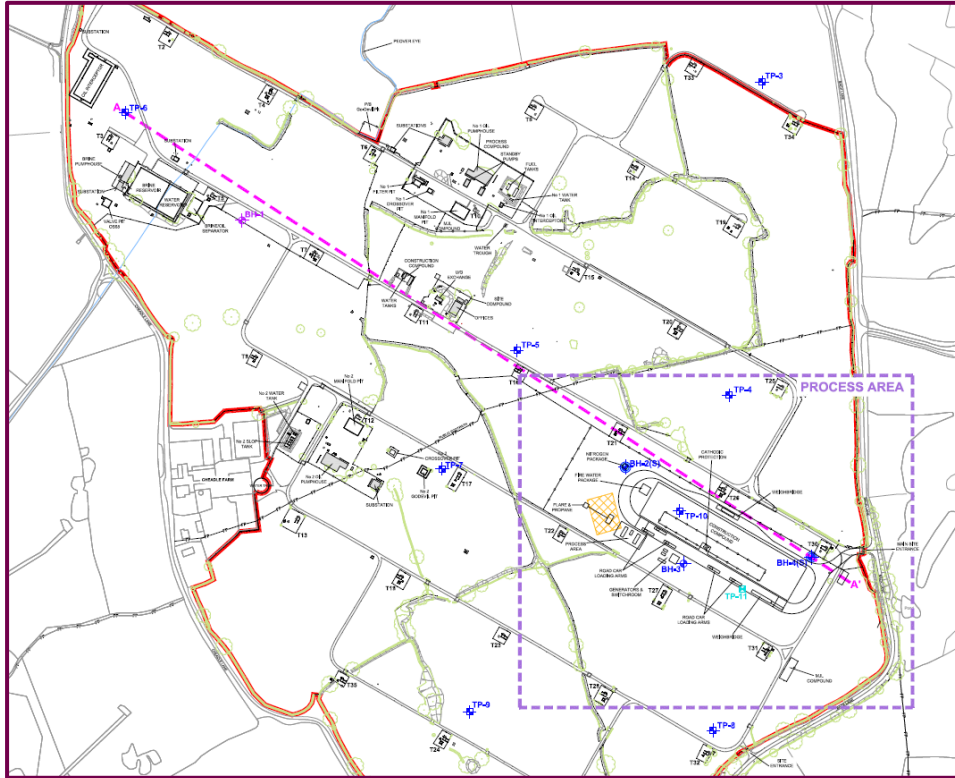


Figure 2. Ground investigation undertaken on the Plumley PSD in 2014 (Ref. 6)

2.4.4 That ground investigation included the following exploratory locations:

- Three locations drilled to a depth of 10.0 m by a Dynamic Sampling approach (BH-2(S), BH-3 and BH-4(S))
- Nine locations drilled by Windowless Sampling approach (BH-1, TP-3 to TP-10 inclusive). These locations were drilled to a depth of 2.5 mbgl, except for BH-1 which was drilled to 4.0 mbgl.
- Single hand pit to a depth of 1m (TP-11).

2.4.5 Boreholes BG-2(S) and BH-4(S) were installed as groundwater and ground gas monitoring points.

2.4.6 A total of 17 soil samples and 4 groundwater samples were subject to chemical analyses (Jones Environmental Laboratory) for the following suite of parameters:

- CLEA 9 Metals (Cd, Cr, Cu, Pb, Hg, Ni, Zn, As, Se)
- Boron
- pH
- Water Soluble Sulphate
- Organic Matter
- Extractable Petroleum Hydrocarbons (EPH) 5 split
- Speciated Polyaromatic Hydrocarbons (PAH) 16 suite
- Phenol

-
- Cyanide (Total)
 - Asbestos Screen

2.4.7 Leachate analysis (10:1 Batch) was undertaken on four soil samples with the same parameters listed above, with the exception of asbestos

2.4.8 Groundwater elevations were recorded, and ground gas monitoring was completed between 21 and 28 March 2014. Groundwater samples were collected from BH-2(S) and BH-4(S) during the monitoring visits using low flow sampling methods. Prior to the collection of groundwater samples, the wells were developed and purged of eight well volumes of groundwater using high flow pumping equipment.

2.4.9 The laboratory certificates and summary tables for the Plumley PSD soil and groundwater dataset are provided in *Appendix E*. The key observations from a review of those datasets are as follows:

- Soils (17 No. Shallow Samples)
 - The general absence of petroleum hydrocarbons and polycyclic aromatic hydrocarbons from shallow soils
 - Low concentration or absence of metals.
- Groundwater (4 No. Samples from 2 No. boreholes in the process area)
 - General absence of dissolved metals, with the exception of boron.
 - Absence of petroleum hydrocarbons.
 - Occasional polycyclic aromatic hydrocarbons, typically at low concentration. Naphthalene observed most commonly and at highest concentrations of between 0.21 µg/l to 2.66 µg/l.

3 CONCEPTUAL SITE MODEL

3.1 Hydrogeological Model

- 3.1.1 Based on the description of the site setting presented in *Section 2*, a conceptual hydrogeological model has been developed for Plumley PSD site.
- 3.1.2 Except for the concrete-lined wellhead chambers and external subsurface pipelines / infrastructure, the Plumley PSD is situated in an area of largely open land, used for agricultural purposes characterised by:
- A surface layer of Made Ground, beneath roadways and structures, of unproven lithology, that overlies generally cohesive Glacial Till; or
 - Soils directly overlying Glacial Till.
- 3.1.3 A thick sequence of Glacial Till, exceeding 10 m in depth, underlies the Plumley PSD and local area. The Glacial Till is typically cohesive in nature, albeit poorly sorted. It does not form a significant aquifer unit and is not utilised locally for water supply. Groundwater has been identified in granular layers contained in the Glacial Till, which typically occur at depth (i.e. >5 mbgl). Although these granular layers do constitute potential migration pathways within the Glacial Till, they are likely to be discontinuous in nature and unlikely to provide continuous pathways to sensitive surface receptors most notably Peover Eye.
- 3.1.4 The cohesive nature of the near surface Glacial Till can result in the localised presence of perched water within granular Made Ground. This waterbody is not considered to constitute an aquifer unit given its thin and discontinuous nature. Furthermore, the localised distribution of granular Made Ground and granular layers in near surface Glacial Till, mean those horizons are unlikely to provide a continuous, laterally extensive, pathway for the migration of water or other although they could potentially provide a short, localised pathway towards land drainage on the Plumley PSD site.
- 3.1.5 There is little potential for generating significant overland flow on the Plumley PSD, given: the general absence of hardground; largely agricultural land-uses on the site; and shallow topography. Where surface land drains are present near site infrastructure (most notably wellheads and/or roadways) a potential pathway for surface runoff direct to Peover Eye does exist.
- 3.1.6 There is evidence of water collecting in the concrete-lined wellhead containment chambers, that must be periodically removed by over-pumping and discharged to the Plumley interceptor. Anecdotal observations suggest the ground around many of the wellheads is commonly saturated. This implies that the water level in the saturated shallow soils around the wellhead chamber is typically higher than the standing water level inside. This in turn suggests that there is a natural hydraulic gradient orientated into the wellhead chamber. Given these observations, it can be concluded that there is limited potential for the migration of significant quantities of water or other substances out of the containment chambers to underlying or surrounding strata. Furthermore, in the unlikely event that any substances do migrate through the base of the concrete-lined chamber, those substances can be expected to be retained near the wellhead given: the cohesive nature of the Glacial Till; and the expected absence of laterally extensive pathways within the Glacial Till.
- 3.1.7 Chemical quality data collected from the Plumley PSD site confirms the absence of widespread contamination of shallow soils or groundwater, despite the longevity of hydrocarbon transfer and storage operations on the Plumley PSD site.
- 3.1.8 The Glacial Till overlies bedrock of the Mercia Mudstone Group, most notably the Sidmouth Mudstone Formation and Northwich Halite member. Groundwater is not considered significant within these mudstone and halite dominated geological units. Groundwater flow pathways to overlying receptors and/or the till are not considered significant. Localised sand layers with the Mercia Mudstone Group may provide local layers of enhanced permeability but do not form laterally extensive pathways that connect with surface or near surface receptors.

3.2 Pollutant (Source-Pathway-Receptor) Linkages

Background

- 3.2.1 Based on the hydrogeological model presented in *Section 3.1* a Conceptual Site Model (CSM) has been developed for the Plumley PSD to assess the environmental risk and site-specific pollution potential associated with current operations on the facility. That CSM follows the framework outlined in national regulatory guidance, most notably [Land contamination risk management \(LCRM\)](#) (Ref. 7), by identifying active pollutant (source-pathway-receptor, SPR) linkages. This largely qualitative assessment identifies where a plausible pathway linking a possible contamination source and environmental receptor exists. It is the activities / operations summarised in *Table 2.2* that are subject to assessment with regards to pollutant (SPR) Linkages.
- 3.2.2 Where a plausible pollutant linkage is identified any measures required to mitigate the possible environmental outcome on the named receptor is considered.

Contamination Sources

- 3.2.3 The potential source of contamination associated with the current static / steady-state storage of residual hydrocarbons on the Plumley site summarised in *Table 2.2* are as follows:
- Crude oil, leaded petrol and middle distillates contained in 21 No. storage caverns and associated pipework connect cavern to the wellhead.
 - Brine contained in all storage caverns and associated pipework to the wellhead.
 - Diesel used as for fuel tractor mounted vacuum pumps when draining standing water from the wellhead containment chambers.
 - Lubricants and greases used during routine maintenance / monitoring.

Environmental Receptors

- 3.2.4 This assessment only considers the environmental receptors identified in *Table 2.7* and *Table 3.1*.
- 3.2.5 Deep groundwater in the bedrock and local protected sites are not considered receptors of relevance to this local area.
- 3.2.6 Human health receptors are not considered as part of this assessment.

Pathways

- 3.2.7 Potential pathways considered for each receptor identified in *Table 2.7* is summarised *Table 3.1*. The principal pathways identified for this assessment are:
- Downward migration contamination from surface emissions
 - Possible lateral migration from vertical pipelines
 - Direct pathways associated with migration via subsurface drainage.

Table 3.1 Summary of receptors and pathways.

Receptor	Description	Sensitivity	Pathways Considered	Notes
Shallow Soils	Soil including unconsolidated Glacial Till / diamicton	Low	Infiltration of releases to ground or infiltration through concrete lined chambers. Lateral impact of releases from vertical pipelines	-
Shallow Groundwater	Localised saturated lenses of coarse-grained material in	Negligible - Low	Infiltration of releases to ground or infiltration through concrete lined chambers. Lateral impact of releases from vertical pipelines	Groundwater is typically located at depth and overlain by cohesive Glacial Till / diamicton. Thin and discontinuous nature of coarse units in the Glacial Till. Absence of groundwater abstractions or groundwater dependent protected sites.
Deep Groundwater in Bedrock	Groundwater in Northwich Halite member / 'Sidmouth Mudstone Formation	Not Applicable	Not Applicable	No significant groundwater in bedrock
Surface land drainage	Surface water channels / drains	Low	Considered a potential pathway to Peover Eye not a receptor of concern	Distance to Peover Eye greater than 300m
Peover Eye	Surface Water Peover Eye WFD River Body	Low-Moderate	Overland flow into surface land drainage Infiltration of releases to ground or infiltration through concrete lined chambers. Lateral flow to surface land drainage	300m north of northern site boundary. Only plausible pathway via surface land drainage. Direct overland flow not considered possible.
Protected Sites	Not applicable	Not Applicable	No plausible pathway	No designated sites in close proximity to the site (all > 1 km).

Contamination Migration from Wellhead Chambers (21 No.)

3.2.8 Many release scenarios being considered (as summarised in *Table 2.2*) involve a direct release of hydrocarbons or brine to the concrete-lined wellhead chambers. Safety expert estimates consider up to 2 m³ of stored hydrocarbons could be lost from a failure of wellhead pipework within these chambers (Ref. 5). It is therefore reasonable to assume a passive release could be retained within the wellhead chamber given their estimated volume of c. 10 m³ (Ref. 5).

3.2.9 The volume of hydrocarbon that could then be lost to the underlying or adjacent soils by migration through the chamber lining is expected to be small given:

- The small volume of total product lost.
- The rapid recovery of lost product by over-pumping as outlined in the Emergency Response Plans for the Plumley PSD.
- The slow leakage rate associated with minor defects within the concrete lining of the wellhead containment chambers.
- The expected inward orientated hydraulic gradient (i.e. from external soils in to chamber) expected on the PSD site.

3.2.10 Any minor leakage of hydrocarbons through the chamber is likely to be entrained in the underlying soils, given the largely cohesive nature of the Glacial Till / diamicton and the partitioning behaviour of the hydrocarbons involved. Although saturated coarse-grained layers are present in those

deposits, they are typically deep and are not expected to provide laterally extensive pathways that could facilitate migration to other sensitive receptors (i.e. Peover Eye).

- 3.2.11 Depending on the setting of each storage cavern, short pathways with surface land drainage ditches and channels could possibly exist. Specifically, wellheads T8, T14, T15, T19 and T28 are located close to surface land drainage (Ref. 5). The volume of product that could follow such a pathway would however be low and the speed of subsurface migration would be slow. This would allow emergency responses measures to be effectively implemented to protect surface drainage and ultimately water quality in Peover Eye.

Contamination Migration in Areas Outside of the Wellhead Chambers

- 3.2.12 A pressurised release of hydrocarbons or brine from the valves / connections within the wellhead chamber, could result in a low volume hydrocarbon release as a spray over the adjacent chamber wall when the wellhead roof is open. Significant overland flow is not expected given the land surrounding each bund is relatively level and grassed. Local pooling of product on the ground close to the wellhead area would occur in the unlikely event of an accidental release, with a potential that some of that could infiltrate to ground. Emergency responses measures would be able to be effectively implemented to protect shallow soils.
- 3.2.13 Surface water receptors could be affected where wellheads are located close to surface land drainage (i.e. T8, T14, T15, T19 and T28). However, the volume of hydrocarbons or brine that could be lost is likely to be low and emergency response measures would be able to be effectively implemented to protect water quality in Peover Eye.

Wellhead Infrastructure Pathways

- 3.2.14 Decommissioned and emptied pipework runs in the ground between each of the wellheads. Potentially this could provide a pathway for migration within the bounds of the site if a fuel loss to ground took place. However, it is not considered to be plausible that the pipework could provide a pathway for migration of fuel beyond the site given the small theoretical release volumes that have been calculated and sealed nature of those structures.

Contaminant Loss from Cavern Pipework (i.e. Wellhead to Cavern)

- 3.2.15 The pipework at each wellhead runs vertically from the base of the well head chamber into the cavern at depth.

Loss to Shallow Soils & Groundwater

- 3.2.16 It is possible that a release could occur from the pipework at shallow depth, thus impacting shallow soil (i.e. glacial till) and/or shallow groundwater contained in water-bearing, coarse grained layers in the till.
- 3.2.17 Most of the fuel lost to the ground would be retained in the ground in more permeable sand and gravel layers that also contain shallow groundwater. Due to the discontinuous nature of the lenses it is unlikely that fuel could migrate any real distance from the well heads in the sand and gravel lenses.

Loss into the Bedrock at Depth

- 3.2.18 Theoretical losses could occur from the pipework to the bedrock. Given the low permeability of the SMF and Northwich Halite Member, and general absence of groundwater, any product lost is likely unlikely to migrate a significant distance from the pipework.

Pollutant (SPR) Linkage Table

- 3.2.19 The pollutant linkage assessment for Plumley PSD is presented in *Table 3.2*.

3.2.20 The assessment of qualitative risk associated with each pollutant linkage includes consideration of the incorporated (i.e. routine) mitigations that are relevant to the activity being assessed. Given that the ecotoxicity of crude oil is significantly greater than that associated with the brine and accidental release volumes are approximately the same, the worst-case risk assessment associated with hydrocarbons has been presented.

3.2.21 For defining pollutant linkages, one of the following four qualitative assessment of risk has been assigned:

- Negligible – No plausible pathway or the volumes are so small and pathways so complex that no measurable impact is expected.
- Low Risk – A theoretical pathway has been identified but the sensitivity of the receptor is low and/or the expected impact is considered to be of limited extent or duration.
- Moderate Risk – There are reasonable grounds to expect an impact on a receptor although that receptor is only of local importance, or the scale of the impact is likely to be of limited extent or duration.
- High Risk – There are reasonable grounds to expect an impact on a receptor of high sensitivity / high value and that impact could have a large and/or long-lasting impact on those protected features or render a groundwater resource unusable.

Table 3.2 Pollutant linkage table for the Plumley PSD

Contamination Source		Exposure Pathway	Receptor	Incorporated Mitigation / Protection Measures	Qualitative Assessment of Risk	Justification	Ref.
Activity	Contaminants of Concern						
Operational Phase – Current Activities							
Static, steady-state, storage of hydrocarbons	Crude Oil, Leaded Petrol and Middle Distillates (Caverns T1, T11 - T13, T15 -T18, T20, T22 – T25, T27 - T35) Brine in all caverns	Long-term loss of hydrocarbons stored in cavern. Vertical and lateral migration of hydrocarbons.	Shallow soils (Glacial Till)	None required	Negligible	Deep caverns in low permeability environment; Natural sealing behaviour halite units; Absence of evidence of impacts on receptors in local area.	1.1.1
			Shallow groundwater (in Glacial Till)		Negligible		1.1.2
			Surface Water Body / Peover Eye		Negligible		1.1.3
	Loss of hydrocarbons from shallow pipework connecting storage cavern to wellhead. Lateral migration of hydrocarbons.	Shallow soils (Glacial Till)	None required	Negligible - Low	No active pumping.	1.2.1	
		Shallow groundwater (in Glacial Till)		Negligible - Low	No active pumping.	1.2.2	
		Surface Water Body / Peover Eye		Negligible	No plausible pathway.	1.2.3	
Static, steady-state, storage of hydrocarbons	Crude Oil, Leaded Petrol and Middle Distillates (Caverns T1, T11 - T13, T15 -T18, T20, T22 – T25, T27 - T35) Brine in all caverns [Note: the risk associated with loss of brine is lower than that for hydrocarbons which are ecotoxic. Hydrocarbon releases have therefore been assessed]	Failure of wellhead valves / connections due to excess pressure or corrosion or during valve replacement. Loss of hydrocarbons to wellhead containment chamber. Migration through base / walls to ground.	Shallow soils (Glacial Till)	Pressure monitoring & regulation procedures; Routine condition inspection of wellhead & containment area; Underground scanning / testing being undertaken; Emergency hydrocarbon spill & recovery plans.	Negligible - Low	Small release volume predicted (c. 2 m ³); Concrete lined containment area with sufficient storage volume; limited migration potential through defects in containment area; Short residence time after lost due to emergency plans; Inward (soils to chamber) hydraulic gradient.	1.3.1
			Shallow groundwater (in Glacial Till)		Negligible - Low		
		As above. Lateral migration in soils to surface land drainage. Transport to surface water body.	Surface Water Body / Peover Eye	As above	Negligible - Low	Low probability of plausible lateral pathway in the glacial till to surface land drainage. Emergency response measures / protocols to protect flow to Peover Eye.	1.3.3

Table 3.2 Pollutant linkage table for the Plumley PSD (Continued)

Contamination Source		Exposure Pathway	Receptor	Incorporated Mitigation / Protection Measures	Qualitative Assessment of Risk	Justification	Ref.
Activity	Contaminants of Concern						
Operational Phase – Current Activities							
Static, steady-state, storage of hydrocarbons	Crude Oil, Leaded Petrol and Middle Distillates (Caverns T1, T11 - T13, T15 -T18, T20, T22 – T25, T27 - T35) Brine in all caverns [Note: the risk associated with loss of brine is lower than that for hydrocarbons which are ecotoxic. Hydrocarbon releases have therefore been assessed]	Failure of wellhead valves / connections due to excess pressure or during replacement of valves. Spray loss of hydrocarbons outside of wellhead containment chamber direct to ground.	Shallow soils (Glacial Till)	As above	Low	Small volume of spray release.	1.4.1
			Shallow groundwater (in Glacial Till)		Negligible - Low	As above Limited migration potential as groundwater bearing layers are typically situated at depth beneath cohesive glacial till. Low sensitivity receptor	1.4.2
		As above. Surface runoff of or shallow migration pathway to surface land drainage. Transport in surface land drainage to surface water receptor.	Surface Water Body / Peover Eye	As above Site drainage thought to run through interceptor before leaving site. The interceptor is fitted with oil on water and brine detectors. The oil in water detector triggers an alarm in the site office and closes a control valve on the outfall.	Negligible - Low	Small release volume Limited scope for surface runoff to surface land drainage. Limited potential for shallow lateral pathway. Site drainage thought to run through interceptor before leaving site. Detectors and oil in water alarm installed to prevent pollution leaving site. Emergency response measures / protocols for losses to site drainage.	1.4.3
Periodic over-pumping of standing water into external drainage system using tractor mounted vacuum pump	Diesel	Mechanical failure associated with tractor. Small release of fuel to ground.	Shallow soils (Glacial Till)	Routine maintenance of vehicles.	Low	Low probability. Small volumes released. Receptor of low sensitivity	1.5.1
			Shallow groundwater (in Glacial Till)		Negligible - Low	Deep migration pathway	1.5.2
		As above. Lateral migration in soils to surface land drainage. Transport to surface water body.	Surface Water Body / Peover Eye	As above. Site drainage thought to run through interceptor before leaving site. The interceptor is fitted with oil on water and brine detectors. The oil in water detector triggers an alarm in the site office and closes a control valve on the outfall	Negligible	No plausible pathway Site drainage thought to run through interceptor before leaving site. Detectors and oil in water alarm installed to prevent pollution leaving site.	1.5.3

4 APPLICATION SITE CONDITION REPORT

4.1 Application Phase

- 4.1.1 This SCR is prepared in accordance with the Environment Agency Horizontal Guidance Note H5 (Ref. 1) and provides references to the various chapters of this report, where available information on the known current condition of the operational area is provided.

4.2 Site Condition Report Summary

1.0 Site Details	
Name of the applicant	The Oil & Pipelines Agency
Activity address	Plumley Oil Storage Facility, Back Lane, Knutsford, Cheshire. WA16 9SJ
National grid reference	SJ 72585 73923
Site area (ha)	c. 80 hectares
Document reference and dates for Site Condition Report at permit application and surrender	220523 R JER9424 AG PLY SCRIED V2R2
Document references for site plans (including location and boundaries):	<i>Drawing 1</i>

2.0 Condition of the land at permit issue	
Environmental setting including: <ul style="list-style-type: none">• Topography• Geology• Hydrogeology• Hydrology• Environmental Consents, Licences, Authorisations, Permits and Designations	Section 2.3
Pollution history including: <ul style="list-style-type: none">• Location, nature of incidents or direct discharges that may have affected soil or groundwater• Historical land uses and associated contaminants	Section 2.2 and Section 2.4
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	Section 2.4
Baseline soil and groundwater reference data	The historical soil and groundwater quality dataset available for the Plumley site is provided in Appendix E and described in Section 2.4
Supporting information	Further supporting information is provided in the Appendices referenced in the above sections.

3.0 Permitted activities

Permitted activities	Section 1.3 and Section 2.2
Non-permitted activities undertaken	Not Applicable
Document references for: <ul style="list-style-type: none">• plan showing activity layout; and• environmental risk assessment.	Section 2.2 Section 3.2

5 IED BASELINE REPORTING

5.1 Stage 1: Identify which Hazardous Substances are Used, Produced or Released at the Installation

- 5.1.1 The IED relates to contamination risk associated with “hazardous substances” used, produced or released on the facility. Hazardous substances are defined as substances or mixtures defined in Article 3 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on Classification, Labelling and Packaging of substances and mixtures (the “CLP Regulations”). The determination of whether a substance is a hazardous substance is largely determined using the substance CAS Number, the [European Chemicals Agency \(ECHA\) online database](#) and a review of Safety Data Sheets (SDS) for each substance.
- 5.1.2 The permitted operations and associated activities undertaken on the Plumley PSD are described in *Section 2.2* and summarised in *Table 2.1*. The key operations to be undertaken are the static, steady-state, storage of hydrocarbons and future hydrocarbon removal. There are no substances produced or emitted from the installation.
- 5.1.3 The substances used on the installation during current operations and associated activities therefore include:
- Crude Oil (Mixture, principally CAS No. 8002-05-9)
 - Leaded Petroleum (Mixture, principally CAS No. 8002-05-9)
 - Middle distillates (Mixture, principally CAS No. 68410-96-8)
 - Brine (sodium chloride solution) (CAS No. 7647-14-5)
 - Lubricating oils / greases for wellhead maintenance (CAS No. 74869-22-0 and 74869-21-9).
 - Diesel as fuel for generator during product removal (Mixture, CAS No. 68334-30-5)
- 5.1.4 SDSs for crude oil, petroleum and diesel are provided in *Appendix I*.
- 5.1.5 Crude oil, petroleum, middle distillates, diesel and lubricating oils / greases are all complex mixtures of hydrocarbons that are considered Hazardous Substances used, produced or released on the facility. Following a review of the [European Chemicals Agency \(ECHA\) online database](#), the brine (sodium chloride) solution is not considered hazardous under CLP in respect to soils and groundwater. The brine solution does however have the potential to have an adverse effect on flora and fauna in freshwater surface waterbodies if discharged in sufficient quantity and duration. For this reason, brine has been considered as part of the pollutant (SPR) linkage assessment in relation to surface water receptors required for this Site Condition Report and as summarised in *Table 3.2*.

5.2 Stage 2: Identify Relevant Hazardous Substances Used, Produced or Released at The Installation

- 5.2.1 Stage 1 identified the hazardous substances used on the Plumley PSD as part of site operations. Stage 2 requires a review of the listed substances to determine which considered are Relevant Hazardous Substances (RHSs). Each of the substances identified within Stage 1 are reviewed below, considering their chemical and physical properties and how they are stored and used on site, to determine the potential pollution risk of each hazardous substance.
- 5.2.2 RHSs in relation to IED are defined as “those substances or mixtures defined within Article 3 of Regulations (EC) No1272/2008, which, as a result of their hazardousness, mobility, persistence and biodegradability (as well as other characteristics), are capable of contaminating soil or groundwater and are used, produced and/or released by the installation”.
- 5.2.3 An assessment of Hazardous Substances identified on the Plumley is presented in Table 5.1. Crude oil and diesel are considered RHSs.

Table 5.1 Summary of Potential Pollution Risk of Hazardous Substances

Hazardous Substance (CAS No)	Chemical Characteristics /Risks	Physical State	Solubility in Water	Toxicity	Mobility	Persistence	Soil and Groundwater Pollution Potential	RHS
Crude Oil (8002-05-9)	Highly flammable liquid and vapor. Harmful in contact with skin. Causes skin irritation. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure. Very toxic to aquatic life with long lasting effects.	Liquid	Low	Acute.	Low - High Variable properties of each hydrocarbon fraction.	High	Very toxic to aquatic life with long lasting effects. Persistent and in liquid form. Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.	Yes
Leaded Petroleum	Extremely flammable liquid and vapor. Causes skin irritation. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. May cause damage to organs (blood, liver, kidney) through prolonged or repeated exposure. May be fatal if swallowed and enters airways. Toxic to aquatic life with long lasting effects.	Liquid	Low	Acute	Low - High	High	Very toxic to aquatic life with long lasting effects. Persistent and in liquid form. Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.	Yes
Middle Distillates	As above	Liquid	Low	Acute	Low - High	High	Very toxic to aquatic life with long lasting effects. Persistent and in liquid form. Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.	Yes
Diesel (68334-30-5)	Flammable liquid and vapour. Harmful if inhaled and causes skin irritation. May cause damage to organs. May be fatal if swallowed and enters airways.	Liquid	Low / Insoluble	Acute	Moderate	High	Toxic to aquatic life with long lasting effects. Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent	Yes

Hazardous Substance (CAS No)	Chemical Characteristics /Risks	Physical State	Solubility in Water	Toxicity	Mobility	Persistence	Soil and Groundwater Pollution Potential	RHS
	Toxic to aquatic life with long lasting effects.						further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground	
Lubrication Oils (74869-22-0)	A complex combination of hydrocarbons obtained from solvent extraction and dewaxing processes. It consists predominantly of saturated hydrocarbons having carbon numbers in the range C15 through C50.	Liquid	Low	Carcinogenic	Low	High	Low given the small volumes used within the bunded containment areas.	No
Lubrication Greases (74869-21-9)	A complex combination of hydrocarbons having carbon numbers predominantly in the range of C12 through C50. May contain organic salts of alkali metals, alkaline earth metals, and/or aluminium compounds.	Soft Solid	Low	Carcinogenic	Low	High	Limited potential given low mobility and small volumes used within the bunded containment areas.	No

5.3 Stage 3: Assessment of the Site-Specific Pollution Potential in Relation to Soils and Groundwater

- 5.3.1 Each of the relevant hazardous substances identified in Stage 2 are to be considered in Stage 3 in the context of the Plumley PSD itself to determine whether circumstances exist which may result in the release of the substance in sufficient quantities to represent a site-specific pollution risk, either as a result of a singular emission or as a result of accumulation from multiple emissions.
- 5.3.2 Circumstances under which emissions may occur include:
- Controlled / planned emissions;
 - Accidents and / or incidents; and
 - Routine operations.
- 5.3.3 Those circumstances from which an emission of RHSs on the Plumley PSD may occur relate to accidents / incidents.
- 5.3.4 Lubrication oils and greases used on the Plumley PSD are not considered to have a site-specific pollution potential given: the very small amount used on the Plumley PSD; their temporary presence on the site; use within the wellhead containment chambers; and their low mobility.
- 5.3.5 The site-specific pollution potential associated with the stored hydrocarbons has been assessed for the operations and associated activities undertaken on the Plumley PSD. That assessment is presented in *Table 3.2* and included consideration of the risk to all environmental receptors, not only the soil and groundwater receptors required for the IED. Those pollutant linkages with a qualitative assessment or risk of low or greater include the following:
- Pollutant Linkage 1.4.1
 - Static, steady state storage of hydrocarbons: Failure of wellhead valves / connections due to excess pressure. Spray loss of hydrocarbons outside of wellhead containment chamber direct to ground.
 - **Risk to Shallow Soils (Glacial Till / Diamicton): Low**
 - Pollutant Linkage 1.4.3.
 - Static, steady state storage of hydrocarbons: Failure of wellhead valves / connections due to excess pressure or routine maintenance thereof. Spray loss of hydrocarbons outside of wellhead containment chamber direct to ground. Surface runoff of or shallow migration pathway to surface land drainage. Transport in surface land drainage to surface water receptors.
 - **Risk to Surface Water Body / Peover Eye: Low**
 - Pollutant Linkage 1.5.1.
 - Static, steady state storage of hydrocarbons: Periodic removal of standing water in wellhead chamber using tractor mounted vacuum pump. Mechanical failure associated with tractor resulting small release of diesel fuel direct to ground.
 - **Risk to Shallow Soils (Glacial Till / Diamicton): Low**
- 5.3.6 It is noted that pollutant linkage 1.4.3 represents a theoretical risk to surface water (Peover Eye), as opposed to soils or groundwater, should subsurface land drains be present and provide a direct pathway thereto.

Table 5.2 Summary of Actual Pollution Risk (Soils & Groundwater) for Relevant Hazardous Substances.

Relevant Hazardous Substance	Amount of RHS Used Annually	Maximum amount RHS stored at the Site	Operation / Activity Details of Existing Pollution Prevention Measures	Actual Pollution Risk? (Yes / No)
Crude Oil / Leaded Petroleum / Middle Distillates	Not applicable	Approximately 209,561 m ³ of hydrocarbons stored in 21 of the 35 caverns on the Plumley PSD (T1, T11–T13, T15–T18, T20, T22–T25, T27–T35). Brine is present in all caverns which have a volume of c. 100,000m ³ (See Table 2.1)	<p><u>Static, steady state storage of hydrocarbons:</u></p> <p>Failure of wellhead valves / connections due to excess pressure or routine maintenance / replacement thereof.</p> <p>Spray loss of hydrocarbons outside of wellhead containment chamber direct to ground. Impact on shallow soils (Pollutant linkage 1.4.1)</p> <p>Spray loss of hydrocarbons outside of wellhead containment chamber direct to ground, surface runoff or migration through shallow pathways to land drainage. Impact on shallow soils. Impact on surface water / Peover Eye (Pollutant linkage 1.4.3).</p> <p>Mitigations measures include:</p> <ul style="list-style-type: none"> - Emergency management system: Product recovery in the event on an accidental release. - Routine maintenance / review of all equipment and wellheads. <p>Passive release to concrete-lined wellhead containment chamber, leakage through base / walls of chamber to ground and migration to groundwater bearing horizons in the Glacial Till or surface land drainage or surface water courses / Peover Eye.</p> <p>Losses from cavern or cavern to wellhead pipelines current static, steady state storage of hydrocarbons on the site.</p>	<p>Yes</p> <p>Yes</p> <p>No</p> <p>No</p>
Diesel	Not applicable	Low volume of diesel fuel in tractor.	<p><u>Static, steady state storage of hydrocarbons:</u></p> <p>Periodic removal of standing water in wellhead chamber using tractor mounted vacuum pump. Mechanical failure associated with tractor resulting small release of diesel fuel direct to ground.</p> <p>Risk to shallow soils</p> <p>Mitigations measures include:</p> <ul style="list-style-type: none"> - Emergency management system: Product recovery in the event on an accidental release. - Routine maintenance / review of all equipment and wellheads. 	<p>Yes</p>

6 BASELINE SOIL SAMPLING

- 6.1.1 Given most pollutant (SPR) linkages associated with the static, steady-state storage of hydrocarbons presented in *Table 3.2* have a site-specific risk assessed to be low or negligible, no further baseline soil and groundwater characterisation, over and above that undertaken in 2014 and presented in *Section 2.4.3* (Ref. 6), is considered necessary at this time.
- 6.1.2 Should activities change on the site in the future, the need for further baseline characterisation shall be reconsidered.

7 OPERATION SITE CONDITION REPORT

7.1 Operational Phase

7.1.1 This SCR has been prepared in accordance with the H5 Guidance for Applicants (EA, 2013). This section sets out the information that will be gathered during the operational phase of the facility relevant to the condition of the site.

7.2 Site Condition Report Summary

4.0 Changes to the activity

Have there been any changes to the activity boundary? If yes, provide a plan showing the changes to the activity boundary.	If yes, provide a plan showing the changes to the activity boundary.
Have there been any changes to the permitted activities? If yes, provide a description of the changes to the permitted activities	If yes, provide a description of the changes to the permitted activities
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities? If yes, list them	If yes, list them
Checklist of supporting information	<ol style="list-style-type: none">1. Plan showing any changes to the boundary (where relevant)2. Description of the changes to the permitted activities (where relevant)3. List of 'dangerous substances' used/produced by the permitted activities that were not identified in the Application Site Condition Report (where relevant)

5.0 Measures taken to protect land

Use records that you collected during the life of the permit to summarise whether pollution prevention measures worked. If you can't, you need to collect land and/or groundwater data to assess whether the land has deteriorated.

Checklist of supporting information	<ol style="list-style-type: none">4. Inspection records and summary of findings of inspections for all pollution prevention measures5. Records of maintenance, repair and replacement of pollution prevention measures
--	---

6.0 Pollution incidents that may have had an impact on land, and their remediation

Summarise any pollution incidents that may have damaged the land. Describe how you investigated and remedied each one. If you can't, you need to collect land and /or groundwater reference data to assess whether the land has deteriorated while you've been there.

Checklist of supporting information	<ol style="list-style-type: none">6. Records of pollution incidents that may have impacted on land7. Records of their investigation and remediation
--	--

7.0 Soil gas and water quality monitoring (where undertaken)

Provide details of any soil gas and/or water monitoring you did. Include a summary of the findings. Say whether it shows that the land deteriorated as a result of the permitted activities. If it did, outline how you investigated and remedied this.

Checklist of supporting information	<ol style="list-style-type: none">8. Description of soil gas and/or water monitoring undertaken9. Monitoring results (including graphs)
--	--

8 SURRENDER SITE CONDITION REPORT

- 8.1.1 At permit surrender, the following sections of the SCR template (EPR H5) will be completed and submitted to the EA as part of the permit surrender application. Information that has been gathered over the lifetime of the Permit will be used to identify whether the land is in a satisfactory condition. If necessary, surrender reference data will be collected and remediation will be undertaken if required.

8.0 Decommissioning and removal of pollution risk

Describe how the site was decommissioned. Demonstrate that all sources of pollution risk have been removed. Describe whether the decommissioning had any impact on the land. Outline how you investigated and remedied this.

Checklist of supporting information	10. Site closure plan 11. List of potential sources of pollution risk 12. Investigation and remediation reports (where relevant)
--	--

9.0 Reference data and remediation (where relevant)

Say whether you had to collect land and/or groundwater data. Or say that you didn't need to because the information from sections 3, 4, 5 and 6 of the Surrender Site Condition Report shows that the land has not deteriorated.

If you did collect land and/or groundwater reference data, summarise what this entailed, and what your data found. Say whether the data shows that the condition of the land has deteriorated, or whether the land at the site is in a "satisfactory state". If it isn't, summarise what you did to remedy this. Confirm that the land is now in a "satisfactory state" at surrender.

Checklist of supporting information	13. Land and/or groundwater data collected at application (if collected) 14. Land and/or groundwater data collected at surrender (where needed) 15. Assessment of satisfactory state 16. Remediation and verification reports (where undertaken)
--	---

10.0 Statement of site condition

Using the information from sections 3 to 7, give a statement about the condition of the land at the site. This should confirm that:

- 17. the permitted activities have stopped
 - 18. decommissioning is complete, and the pollution risk has been removed
 - 19. the land is in a satisfactory condition
-

REFERENCES

1. Environment Agency (EA). 2013. [H5 Guidance for Applicants, Environmental Permitting Regulations, Site Condition Report – Guidance and Templates. Version 3. May, 2013.](#)
2. European Commission (EC). 2015. [European Commission Guidance concerning baseline reports under Article 22\(2\) of Directive 2010/75/EU on industrial emissions \(2014/C 136/03\)](#)
3. European Parliament and Council. 2010. [Directive 2010/75/EU on industrial emissions \(integrated pollution prevention and control\) of 24 November 2010](#)
4. [European Chemicals Agency \(ECHA\) online database](#)
5. Plumley and Cape of Good Hope Petroleum Storage Depots, CDOIF Phase 1 Screening Assessment, (Rambol Environ, Report Ref. UK14-21811, September 2017)
6. Factual & Interpretative Ground Investigation Report (GIR), Plumley Oil Storage Facility, Cheshire. Worley Parsons Consulting. Report Ref 305002-00009/51670-00 GIR. June 2014
7. [Land contamination risk management \(LCRM\)](#). Environment Agency, Updated 19 April 2021.

Drawings



Legend

Site Boundary

- Plumley PSD
- CoGH PSD - Well Heads

Figure Title
Site Location

Project Name
Plumley

Project Number UK14-21811	Figure No. 1
Date August 2017	Prepared By BM
Scale 1:6,000 @A3	Issue 1

Client
Oil and Pipelines Agency

RAMBOLL ENVIRON

A large, stylized graphic of the number '1' in a light beige color. The top horizontal bar of the '1' contains the word 'Appendices' in a dark purple font. A smaller, solid dark purple '1' is positioned inside the top-left corner of the larger beige '1'.

Appendices

Appendix A

Photographs of Plumley PSD

Photographs of the Plumley PSD Site (24 January 2022)



Cavern T11. Entrance



Cavern T11. Wellhead containment chamber



Cavern T11. Standing water in wellhead containment chamber



Plumley PSD Interceptor



Plumley PSD Interceptor Chambers.

Appendix B

BGS Borehole Logs

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No. 3455/1331

CONFIDENTIAL
 SJ77SW

Name and Number of Shaft or Bore

SS77/138

For Messrs. I.C.I.

Town or Village Netherton

County Six-inch quarter sheet

6-inch Map Registered No.

Exact site

(Attach a tracing from a map, or a sketch-map, if possible.)

Purpose for which made Salt (P.B. Scheme)

Level at which shaft bore commenced relative to O.D. c. 110 State if shaft bore is up, down, horizontal or inclined; in latter cases give angle of inclination and direction

Made by John Thon

Information from I.C.I. Date of Sinking 1952-3

Specimens

Additional Notes in Space Overleaf

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS	DEPTH
	Red clay		31
	Red clay and gravel		58
	Red clay and gravel		61
	Red clay and marl		64
	Grey marl		133
	Red + grey marl		160
	Red marl		193
	Red + grey		199
	Red		208
	Red and grey		217
	Red		274
	Red + grey		295
	Grey		304
	Red		319
	Red + grey		325
	Grey		331
	Red		355
	Red + grey		361
	Red		364
	Red + grey		395
	Grey		410
	Red + grey		434
	Grey		
	(Salt at 435/6)		
	Salt rock w. grey marl		437
	"		458
	Salt		476
	no samples		592
	Salt		659

Continued Overleaf

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON,	Date received	Correspondence File No.	1" N.S. Map No.	1" O.S. Map No.	Site marked (two symbols) on 1" Map	on 6" Map



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

100% CONFIDENTIAL
 RECORD OF SHAFT OR BORE FOR MINERS
 SJ77SW

(For Survey use only)
 6-inch Map Registered No. 121
 WIRE 34 SE 1/4

Name and Number of Shaft or Bore

For Messrs. ICI
 Town or Village Netherton
 County Six-inch quarter sheet

6-inch Map Registered No.

Exact site

Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Salt (P.B. Scheme)

Level at which shaft bore commenced relative to O.D. c. 110 State if shaft bore is up, down, horizontal or inclined; in latter cases give angle of inclination and direction

Made by John Thon

Information from ICI Date of Sinking 1952-3

Specimens

Additional Notes in Space Overleaf

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS	DEPTH
	Red clay		31
	Red clay and gravel		58
	Red clay with grey sand marl		61
	Grey marl		64
	Red to grey marl		132
	Red marl		160
	Red to grey		193
	Red		199
	Red and grey		208
	Red		217
	Red to grey		274
	Grey		295
	Red		304
	Red to grey		319
	Grey		325
	Red		331
	Red to grey		355
	Red		361
	Red to grey		364
	Grey		395
	Red to grey		410
	Grey		434
	(Salt at 435/6)		
	Salt rock w. grey marl		437
	"		458
	Salt		476
	no samples		592
	Salt		659
		Continued	Overleaf

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.

Date received Correspondence File No. 1" N.S. Map No. 1" O.S. Map No. Site marked (use symbol) on 1" Map on 6" Map

		THICKNESS		DEPTH	
	Salt + marl			677	
	Salt			683	
	Salt and marl			719	
	Salt			737	
	Salt and marl			767	
	Marl			776	
	Salt and marl			791	
	Marl			797	
	Salt and marl			800	
	Salt			869	
	Salt and marl			1007	
	Salt			1055	
	Salt and marl			1080	
coming	Red marl banded w. grey	2	9	1082	9
	Red and grey marl	4	7	1087	4
	Grey marl	3	2	1090	6
	Red marl	1	0	1091	6
	Red & grey marl	1	1	1092	7
	Grey banded w. red marl	2	10	1095	5
	Nearly salt	2	6	1097	11
	Red marl	2	5	1100	4
ends	Salt	25	8	1126	0
	Salt			1132	
	"			1200	

ADDITIONAL NOTES

SJ 77 SW / 138-143

CONFIDENTIAL

Borehole	H 198 / 138		H 185 / 139		H 186 / 140		H 187 / 141		H 188 / 142		H 189 / 143	
Description of Strata	Thick- ness Ft	Depth F B S	Thick- ness Ft	Depth F B S	Thick- ness Ft	Depth F B S	Thick- ness Ft	Depth F B S	Thick- ness Ft	Depth F B S	Thick- ness Ft	Depth F B S
Glacial Drift	14	14 4.27m	38	38 11.58m	40	40 12.19m	38	38 11.58m	40	40 12.19m	38	38 11.58m
Red and Grey Marl (Middle Keuper Marl)	661	675 205.74m	531'6"	600'6" 183.03m	512	552 168.25m	450	488 148.74m	470'9"	510'9" 155.68m	425	463 141.13m
Rock Salt with occasional Marl Bands Zones H I J												
Rock Salt with massive Marl Bands Zone G												
Rock Salt with Marl Bands Zones D, E, F		1345 409.96m		1278 389.53m		1211 369.11m		1139 347.12m		11746" 357.99m		1114 339.55m
Marl (30 Ft Marl Band) Zone C	37	1382 421.23m	29	1307 398.37m	32	1243 378.87m	31'6"	1170'6" 356.77	30'6"	1205 367.28m	29	1143 348.29
Bottom of Borehole	33	<u>1415</u>	53	<u>1360</u>	57	<u>1300</u>	53'6"	<u>1224</u>	45	<u>1250</u>	41	<u>1184</u>
		431.29m		414.53m		396.24m		373.08m		381.00m		360.88m

Confidential.

IN CONFIDENCE

5577/132

150
34 SE/13
1932) W.L. 80370/0370 10,000 9/30 A. & B.W.Ltd. Cp. 485

RECORD OF SHAFT OR BORE FOR MINERALS

County **CHESHIRE**

6" Quarter Sheet **34 SE**

1" N.S. Geol. Map **110**

1" O.S. Geol. Map _____

Whether Confidential

CONFIDENTIAL

Name and Number of Shaft or Bore given by Geological Survey:
SS 7130 7355

Name and Number given by owner (if different from above):
H. 171

Town or Village **Helford** Date of sinking _____

Exact site _____

A sketch-map or tracing from a large-scale map is desirable.

Purpose for which made _____

Level at which bore commenced relative to O.D. **119.4** If not down bore, state if horizontal or up _____

Made by _____ for Messrs. **J.C.G. alkali Division**

Information from **J.C.G.** Date received **6 Jan 1950**

Specimens _____ Dip of strata _____

GEOLOGICAL CLASSIFICATION	DESCRIPTION	THICKNESS		DEPTH	
	Drift	44		44	
	Marl			626	
	Salt Rock			704	
	Salt + Marl			724	6
	Salt			849	
	Red + blue marl			855	
	Salt and marl			868	6
	Marl			881	
	Salt w. gypsum			918	
	Rock salt			954	
	Salt + marl			964	
	Red and blue marl			975	
	Salt and marl			1001	6
	Salt			1059	6
	Dirty salt			1083	6
	Red and blue marl			1091	
	Salt rock (dirty)	13	6	1104	6
	Marl	1			
	Dirty rock salt	79	6	1185	
	Marl	4			
	Salt			1285	
	Marl	2			
	Salt	1	6		
	Red and grey marls			1321	7
	Salt rock	111	5	1433	
	Marls			1446	



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

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[SJ77SW BJ 115.]

1461

CONFIDENCE

SJ77SV

Boine & Water Works
Holford.

Charles Sanderson 25
1732

171 Pilot Hole 'B' - Strata

Not Cored to Bony to cavity

Description of Strata	Thickness	Depth from Surface
Dugwell	3'0"	3'0"
Red Sandy Clay	27'0"	30'0"
Red Sandy Clay and Gravel	21'0"	51'0"
Grey Marl and Gravel	6'0"	57'0"
Red Marl	6'0"	63'0"
Red and Grey Marl	6'0"	69'0"
Grey Marl	6'0"	75'0"
Red and Grey Marl	9'0"	84'0"
Red Marl	9'0"	93'0"
Red and Grey Marl	6'0"	99'0"
Grey Marl	6'0"	105'0"
Red Marl	15'0"	120'0"
Red and Grey Marl	30'0"	150'0"
Red and Grey Marl with Gypsum	3'0"	153'0"
Red and Grey Marl with Gypsum	12'0"	165'0"
Red and Grey Marl	18'0"	183'0"
Red Marl	6'0"	189'0"
Red and Grey Marl	3'0"	192'0"
Red and Grey Marl with Gypsum	24'0"	216'0"
Red and Grey Marl	6'0"	222'0"
Red Marl	3'0"	225'0"
Red and Grey Marl	12'0"	237'0"
Red Marl	3'0"	240'0"
Red and Grey Marl with Gypsum	9'0"	249'0"
Red and Grey Marl	21'0"	270'0"
Red and Grey Marl with Gypsum	6'0"	276'0"
Red and Grey Marl	9'0"	285'0"
Red and Grey Marl with Gypsum	15'0"	300'0"
Red and Grey Marl	9'0"	309'0"
Red and Grey Marl with Gypsum	9'0"	318'0"
Red Marl	3'0"	321'0"
Red and Grey Marl	3'0"	324'0"
Red and Grey Marl with Gypsum	42'0"	366'0"
Red and Grey Marl	18'0"	384'0"
Grey Marl	3'0"	387'0"
Red and Grey Marl	12'0"	399'0"
Red and Grey Marl with Gypsum	21'0"	420'0"
Red and Grey Marl	117'0"	537'0"
Grey Marl	3'0"	540'0"
Red and Grey Marl	3'0"	543'0"
Red Marl	6'0"	549'0"
Red and Grey Marl	12'0"	561'0"
Red Marl	3'0"	564'0"
Red and Grey Marl	6'0"	570'0"
Grey Marl	6'0"	576'0"
Red and Grey Marl	9'0"	585'0"
Grey Marl	3'0"	588'0"
Red and Grey Marl	6'0"	594'0"
Red Marl	3'0"	597'0"
Red and Grey Marl	3'0"	600'0"
Grey Marl	59'0"	659'0"

*This hole bored near side of
H 171. to the cavity*

RECORD OF SHAFT OR BORE

34 SE/13
SJ77SW
 MINERAL

County **THE HERTS**
 6" Quarter Sheet **343E**
 1" N.S. Geol. Map **110**
 1" O.S. Geol. Map _____

Whether Confidential
CONFIDENTIAL

Name and Number of Shaft or Bore given by Geological Survey :

Name and Number given by owner (if different from above) :

H. 171

Town or Village *Holford* Date of sinking _____

Exact site _____

A sketch-map or tracing from a large-scale map is desirable.

Purpose for which made _____

Level at which bore commenced relative to O.D. *119.4* If not down bore, state if horizontal or up _____

Made by _____ for Messrs. *J. C. J. alkali Division*

Information from *J. C. J.* Date received *6 Jan 1950*

Specimens _____ Dip of strata _____

GEOLOGICAL CLASSIFICATION	DESCRIPTION	THICKNESS		DEPTH	
	<i>Drift</i>	<i>44</i>		<i>44</i>	
	<i>Marl</i>			<i>626</i>	
	<i>Salt Rock</i>			<i>704</i>	
	<i>Salt + Marl</i>			<i>724</i>	<i>6</i>
	<i>Salt</i>			<i>849</i>	
	<i>Red + blue marl</i>			<i>855</i>	
	<i>Salt and marl</i>			<i>868</i>	<i>6</i>
	<i>Marl</i>			<i>881</i>	
	<i>Salt w. gypsum</i>			<i>918</i>	
	<i>Rock salt</i>			<i>954</i>	
	<i>Salt + marl</i>			<i>964</i>	
	<i>Red and blue marl</i>			<i>975</i>	
	<i>Salt and marl</i>			<i>1001</i>	<i>6</i>
	<i>Salt</i>			<i>1059</i>	<i>6</i>
	<i>Dirty salt</i>			<i>1083</i>	<i>6</i>
	<i>Red and blue marl</i>			<i>1091</i>	
	<i>Salt rock (dirty)</i>	<i>13</i>	<i>6</i>	<i>1104</i>	<i>6</i>
	<i>Marl</i>	<i>1</i>			
	<i>Dirty rock salt</i>	<i>79</i>	<i>6</i>	<i>1185</i>	<i>—</i>
	<i>Marl</i>	<i>4</i>			
	<i>Salt</i>			<i>1285</i>	
	<i>Marl</i>	<i>2</i>			
	<i>Salt</i>	<i>1</i>	<i>6</i>		
	<i>Red and grey marls</i>			<i>1321</i>	<i>7</i>
	<i>Salt rock</i>	<i>111</i>	<i>5</i>	<i>1433</i>	
	<i>Marls.</i>			<i>1446</i>	

GEOLOGICAL SURVEY AND MUSEUM,
 SOUTH KENSINGTON,
 LONDON, S.W.7.

G.S.M. Office File No.	Site marked on 6" Map by	Site marked on 1" Map by
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British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

171 Pilot Hole 'B' - Strata

Not Cores to Boring to cavity

Description of Strata	Thickness	Depth from Surface
Dugwell	3'0"	3'0"
Red Sandy Clay	27'0"	30'0"
Red Sandy Clay and Gravel	21'0"	51'0"
Grey Marl and Gravel	6'0"	57'0"
Red Marl	6'0"	63'0"
Red and Grey Marl	6'0"	69'0"
Grey Marl	6'0"	75'0"
Red and Grey Marl	9'0"	84'0"
Red Marl	9'0"	93'0"
Red and Grey Marl	6'0"	99'0"
Grey Marl	6'0"	105'0"
Red Marl	15'0"	120'0"
Red and Grey Marl	30'0"	150'0"
Red and Grey Marl with Gypsum	3'0"	153'0"
Red and Grey Marl with Gypsum	12'0"	165'0"
Red and Grey Marl	18'0"	183'0"
Red Marl	6'0"	189'0"
Red and Grey Marl	3'0"	192'0"
Red and Grey Marl with Gypsum	24'0"	216'0"
Red and Grey Marl	6'0"	222'0"
Red Marl	3'0"	225'0"
Red and Grey Marl	12'0"	237'0"
Red Marl	3'0"	240'0"
Red and Grey Marl with Gypsum	9'0"	249'0"
Red and Grey Marl	21'0"	270'0"
Red and Grey Marl with Gypsum	6'0"	276'0"
Red and Grey Marl	9'0"	285'0"
Red and Grey Marl with Gypsum	15'0"	300'0"
Red and Grey Marl	9'0"	309'0"
Red and Grey Marl with Gypsum	9'0"	318'0"
Red Marl	3'0"	321'0"
Red and Grey Marl	3'0"	324'0"
Red and Grey Marl with Gypsum	42'0"	366'0"
Red and Grey Marl	18'0"	384'0"
Grey Marl	3'0"	387'0"
Red and Grey Marl	12'0"	399'0"
Red and Grey Marl with Gypsum	21'0"	420'0"
Red and Grey Marl	117'0"	537'0"
Grey Marl	3'0"	540'0"
Red and Grey Marl	3'0"	543'0"
Red Marl	6'0"	549'0"
Red and Grey Marl	12'0"	561'0"
Red Marl	3'0"	564'0"
Red and Grey Marl	6'0"	570'0"
Grey Marl	6'0"	576'0"
Red and Grey Marl	9'0"	585'0"
Grey Marl	3'0"	588'0"
Red and Grey Marl	6'0"	594'0"
Red Marl	3'0"	597'0"
Red and Grey Marl	3'0"	600'0"
Grey Marl	59'0"	659'0"

*This hole bored near site of
 H 171. to the cavity*

IN CONFIDENCE

5577

14
1330

RECORD OF SHAFT OR BORE FOR MINERALS

SJ 7119 7348

County Nottingham
6" Quarter Sheet 34 SE
1" N.S. Geol. Map 110
1" O.S. Geol. Map _____

Name and Number of Shaft or Bore given by Geological Survey :

Name and Number given by owner (if different from above) :

H175

Town or Village Holford Date of sinking _____

Exact site _____

CONFIDENTIAL

A sketch-map or tracing from a large-scale map is desirable.

Purpose for which made _____

Level at which bore commenced relative to O.D. 119.8 If not down bore, state if horizontal or up _____

Made by _____ for Messrs. J.C. Alkali Division

Information from J.C. Holford Date received Jan 6 1956

Specimens _____ Dip of strata _____

GEOLOGICAL CLASSIFICATION	DESCRIPTION	THICKNESS		DEPTH	
	Drift	55			
	Marl				654
	Salt				757
	Rock and marl	9			803
	Salt				877
	Salt and marl	12			
	Salt				877
	Salt and marl	5			
	Red and blue marls w. gypsum	7			907
	Salt	10			
	Red and blue marls	8	6		
	Salt and marl				948
	Salt				986
	Salt and marl	11	6		
	Marls w. gypsum and salt				1029 6
	Salt				1132
	Salt and marl				1145
	Salt				1194
	Rock salt with marl				1239
	Salt rock				1259
	Salt and marl	8			
	Salt				1311
	Salt and marl				1322
	Salt rock				1341
	Red marl	30			1371
	Blue marl w. salt	2			
	Red marl	4			
	Salt w. marl	4			
	Salt rock				1489 6



143 SJ77SW CONFIDENCE II/133
 Brine & Water Works,
 Holford.

CONFIDENTIAL

175 Pilot Hole No.2 - Strata

N. core Boring to cavity

Description of Strata	Thickness	Depth from Surface
Dugwell	3'6"	3'6"
Red Sandy Clay	20'6"	24'0"
Red Sandy Clay and Gravel	24'0"	48'0"
Red Marl	9'0"	57'0"
Red and Grey Marl	6'0"	63'0"
Red Marl	3'0"	66'0"
Red and Grey Marl	60'0"	126'0"
Red and Grey Marl with Gypsum	32'0"	158'0"
Red and Grey Marl with Gypsum	60'0"	218'0"
Red and Grey Marl with Gypsum	82'0"	300'0"
Red and Grey Marl with Gypsum	66'0"	366'0"
Red and Grey Marl	12'0"	378'0"
Grey Marl	8'0"	386'0"
Red and Grey Marl with Gypsum	17'0"	403'0"
Red and Grey Marl	30'0"	433'0"
Red and Grey Marl with Gypsum	77'0"	510'0"
Red and Grey Marl	9'0"	519'0"
Grey Marl	15'0"	534'0"
Red and Grey Marl	9'0"	543'0"
Gr Marl	6'0"	549'0"
Grey Marl	3'0"	552'0"
Red and Grey Marl	44'0"	596'0"
Grey Marl	7'0"	603'0"
Red and Grey Marl	8'0"	611'0"
Red and Grey Marl	44'0"	655'0"

This hole bored at site of
 H. 175 to cavity



152 34 SE/14

RECORD OF SHAFT OR BORE FOR MINERAL

SJ77SW

County **CHESHIRE**
6" Quarter Sheet **3456**
1" N.S. Geol. Map **110**
1" O.S. Geol. Map _____

14
116

Name and Number of Shaft or Bore given by Geological Survey:

Name and Number given by owner (if different from above):

H175

Town or Village **Holford** Date of sinking _____

Exact site _____

CONFIDENTIAL

A sketch-map or tracing from a large-scale map is desirable.

Purpose for which made _____

Level at which bore commenced relative to O.D. **119.8** If not down bore, state if horizontal or up _____

Made by _____ for Messrs. **J.C.9 Alkali Division**

Information from **J.C.9 Holford** Date received **Jan 6 1956**

Specimens _____ Dip of strata _____

GEOLOGICAL CLASSIFICATION	DESCRIPTION	THICKNESS		DEPTH	
	Drift	50			
	Marls			654	
	Salt			757	
	Rock and marl	9		803	
	Salt			877	
	Salt and marl	12			
	Salt			877	
	Salt and marl	5			
	Red and blue marls w. gypsum	8		907	
	Salt	10			
	Red and blue marls	8	6		
	Salt and marls			948	
	Salt			986	
	Salt and marl	11	6		
	Marls w. gypsum and salt			1029	6
	Salt			1132	
	Salt and marl			1145	
	Salt			1194	
	Rock salt with marl			1239	
	Salt rock			1259	
	Salt and marl	8			
	Salt			1311	
	Salt and marl			1322	
	Salt rock			1341	
	Red marl	30		1371	
	Blue marl w. salt	2			
	Red marl	4			
	Salt w. marl	4			
	Salt rock			1489	6

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON, S.W.7.

G.S.M. Office File No.	Site marked on 6" Map by	Site marked on 1" Map by
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British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

Chester 34 SE 116

SJ77SW 116

Brine & Water Works,
Holford.

CONFIDENTIAL

175 Pilot Hole No.2 - Strata

N. core Boring to cavity

Description of Strata	Thickness	Depth from Surface
Dugwell	3'6"	3'6"
Red Sandy Clay	20'6"	24'0"
Red Sandy Clay and Gravel	24'0"	48'0"
Red Marl	9'0"	57'0"
Red and Grey Marl	6'0"	63'0"
Red Marl	3'0"	66'0"
Red and Grey Marl	60'0"	126'0"
Red and Grey Marl with Gypsum	32'0"	158'0"
Red and Grey Marl with Gypsum	60'0"	218'0"
Red and Grey Marl with Gypsum	82'0"	300'0"
Red and Grey Marl with Gypsum	66'0"	366'0"
Red and Grey Marl	12'0"	378'0"
Grey Marl	8'0"	386'0"
Red and Grey Marl with Gypsum	17'0"	403'0"
Red and Grey Marl	30'0"	433'0"
Red and Grey Marl with Gypsum	77'0"	510'0"
Red and Grey Marl	9'0"	519'0"
Grey Marl	15'0"	534'0"
Red and Grey Marl	9'0"	543'0"
Grey Marl	6'0"	549'0"
Grey Marl	3'0"	552'0"
Red and Grey Marl	44'0"	596'0"
Grey Marl	7'0"	603'0"
Red and Grey Marl	8'0"	611'0"
Red and Grey Marl	44'0"	655'0"

*This hole bored at site of
H. 175 to cavity*

SJ77SW 277
73324 74757

Sampling					Strata			
Depth	Type	Casing Depth	Date/Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend
			20/04 1993		TOPSOIL** [Topsoil]	G.L. (0.45)	35.81	
0.45-1.00	SD		DRY	11	Firm orange-brown mottled grey silty sandy CLAY with occasional gravel. [Glacial Till]	0.45	35.36	
1.25-1.50	SD	1.50	DRY	10	Below 1.50m: dark orange-brown with a little fine and medium gravel.			
2.20-2.40	SD	1.50	DRY	11		(4.15)		
3.25-3.80	SD	3.00	DRY	16	Below 3.35m: firm to stiff, very sandy.			
4.15-4.40	SD	4.20	DRY	50/180	Very dense brown clayey fine and medium SAND. [Glacial Sand and Gravel]	4.60-4.75	31.21-31.06	
5.20-5.45	SD	5.20	DRY	50/160	Very stiff brown sandy CLAY with a little fine and medium gravel. [Glacial Till]			
6.20-6.45	SD	5.20	DRY	40		(4.35)		
7.20-7.50	SD	7.00	DRY	42				
8.25-8.50	SD	7.00	DRY	45				
9.10-9.40	SD	9.00	DRY	40	Very stiff dark brown poorly laminated silty CLAY with occasional fine gravel. [Glacial Till]	9.10	26.71	
						(1.75)		
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig Borehole Dia (mm) 150 to 17.15m S to 30.52m Casing Dia (mm) 150 to 17.15m S to 17.00m					Groundwater No. Struck Behaviour Sealed None encountered during drilling.		Ground Level Coordinates 35.81 m OD 113338.2 94754.5 Drilled by KJ HN Logged by SW JW Checked by	
Remarks 1. A little water added throughout to assist drilling. 2. Hard strata/Chiselling: 12.40m to 12.70m (45 mins). See key sheet and appendices for explanations.					Form 1/0			
Borehole Record Exploration Associates					Project M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit		Contract 02200 Borehole 324(1 of 4)	

SJ77SW 277

Sampling					Strata			
Depth / Drill Run	Type / TCW/SCR	Casing (ROD)	Date/ Water	SPT N (Cu)/F1	Description	Depth (Thickness)	Level	Legend
10.10	D		20/04		(See previous sheet - very stiff CLAY).			
10.40-10.85	SD	10.25	DRY	43		10.85	24.96	
11.00	D				Very stiff brown very sandy CLAY with some sub-angular to sub-rounded fine, medium and coarse gravel.			
11.40-11.85	SD	10.20	DRY	48	[Glacial Till]			
12.25	D							
12.60-12.82 12.60-13.00	C B	12.30	DRY	50/ 70		(4.25)		
13.25	D							
13.40 13.45-13.82	U SD	13.00	DRY	50/ 220				
14.30	D							
14.65-15.05	SD	13.00	DRY	50/ 250				
15.10-15.50	B					15.10	20.71	
15.50		15.50	DRY	21/04	Red-brown, mottled grey highly weathered silty MUDSTONE recovered as silty clay with occasional sub-angular mudstone lithorelicts.			
15.75-16.20	SD	15.50	13.40 14.70	51	[Mercia Mudstone WG IV]	(2.05)		
16.75	D							
17.15						17.15	18.66	
18.57	100% (100%)	(70%)		4	Red-brown thinly and thickly laminated silty MUDSTONE with frequent sub-horizontal planar discontinuities and discontinuous gypsum bands. Very weak to weak. [Mercia Mudstone WG IIIa] At 17.53m: open sub-horizontal discontinuity. At 18.34m: open sub-horizontal discontinuity. 18.45m to 18.57m: grey-green in colour. Below 18.57m: becoming red-brown and grey-green thickly interlaminated silty mudstone and clayey siltstone. Weak to very weak. Bands of siltstone up to 35mm thick, frequent sub-horizontal gypsum bands up to 8mm thick. (Mercia Mudstone WG IIIa - II)			
				>20				
				19				
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig					Groundwater No. Struck Behaviour		Sealed Ground Level Coordinates	
Borehole Dia (mm) 150 to 17.15m S to 30.52m		Casing Dia (mm) 150 to 17.15m S to 17.00m		British Geological Survey		35.81 m OD 113338.2 94754.5 mE mN		
Drilled by Logged by Checked by					XP MN SW JW			
Remarks								
See key sheet and appendices for explanations.								
Form 1/0								
Borehole Record				Project			Contract	
British Geological Survey				M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit			D2200	
Exploration Associates				British Geological Survey			Borehole	
							324(2 of 4)	

SJ77SW 277

Sampling					Strata					
Drill Run	TCR (SCR)	Casing (ROD)	Date/ Water	SPT N FI	Description	Depth (Thickness)	Level	Legend		
	100% (91%)	(39%)	21/04		(See previous sheet - silty MUDSTONE)					
				19	Below 20.90m: with rare siltstone bands. Weak to moderately weak.					
21.57				9	21.47m to 21.57m: with sub-vertical gypsum filled discontinuity, 8mm wide.					
				NI	Below 21.77m: becoming more weathered.					
					(Mercia Mudstone WG IIIa - II)					
					22.19m to 22.35m: sub-vertical gypsum filled discontinuity, 5mm wide.					
	94% (88%)	(40%)		12	23.39m to 23.52m: sub-vertical gypsum filled discontinuity, 15mm wide.					
				NR	Below 24.07m: with occasional grey-green bands.					
24.52				NR						
				NI	From 24.67m to 25.19m: grey-green in colour, and with bands of clayey siltstone up to 15mm wide.					
				9	25.32m to 25.48m: sub-vertical gypsum filled discontinuity, 6mm wide.					
				NI						
	95% (79%)	(55%)		6	26.08m to 26.16m: sub-vertical gypsum-filled discontinuity.					
				9						
27.52				NI	Below 27.52m: gypsum bands up to 25mm wide, but generally <10mm.					
				>20						
				3	28.72m to 28.94m: sub-vertical gypsum filled discontinuity, 8mm wide.					
				NI						
				4						
				NI						
				>20						
	98% (92%)	(39%)		NI	29.66m to 29.80m: sub-vertical gypsum filled discontinuity, 7mm wide.					
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig					Groundwater No. Struck Behaviour		Sealed	Ground Level Coordinates	35.81 m OD 113338.2 94754.5 mE mN	
Borehole Dia (mm) 150 to 17.15m S to 30.52m		Casing Dia (mm) 150 to 17.15m S to 17.00m							Drilled by Logged by Checked by	KP MH SW JW
Remarks										
See key sheet and appendices for explanations.										
Borehole Record				Project			Contract		d2200	
Exploration Associates				M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit			Borehole		324(3 of 4)	

SJ77 SW 277

Sampling					Strata			
Drill Run	TCR (SCR)	Casing (RQD)	Date/ Water	SPT N Fl	Description	Depth (Thickness)	Level	Legend
			21/04	7	30.17m to 30.42m: sub-vertical gypsum filled discontinuity, 25mm wide.	30.52	5.29	
30.52					End of Borehole.			
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig Borehole Dia (mm) 150 to 17.15m S to 30.52m Casing Dia (mm) 150 to 17.15m S to 17.00m					Groundwater No. Struck Behaviour Sealed British Geological Survey		Ground Level Coordinates 35.81 m OD 113338.2 94754.5 mE mN Drilled by KP MH Logged by SU JW Checked by	
Remarks See key sheet and appendices for explanations.								
Borehole Record Exploration Associates				Project M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit			Contract 02200 Borehole 324(4 of 4)	

12
34 NE / 31
SJ77 NW/3
No. 83 (contd)
CONFIDENTIAL

	Thickness of strata	Depth from surface	Level reduced to ordnance	71m	01m
Loamy clay	22.5'	31.66'	+ 57.65'		9.64
Fine sandy gravel	5.0'	36.66'	+ 52.65'		11.17
Gravel	6.0'	42.66'	+ 46.65'		13.00
Red Marl	8.0'	50.66'	+ 38.65'		15.44
Hard red & grey marls	144.97'	195.63'	- 106.32'		59.62
Brown & grey marls	10.0'	205.63'	- 116.32'		62.67
Marly ROCK SALT	30.0'	235.63'	- 146.32'		71.8
ROCK SALT	72.0'	307.63'	- 218.32'		93.76
Marly ROCK SALT	2.0'	309.63'	- 220.32'		94.37
Red Marl	6.0'	315.63'	- 226.32'		96.20
Grey Marl	4.0'	319.63'	- 230.32'		97.42
Red Marl	7.0'	326.63'	- 237.32'		99.55
Marly ROCK SALT	28.0'	354.63'	- 265.32'		108.09
Red & grey marl	1.0'	355.63'	- 266.32'		108.39
ROCK SALT	49.0'	404.63'	- 315.32'		123.33
Red marl	6.0'	410.63'	- 321.32'		125.16
Hard grey marl	6.0'	416.63'	- 327.32'		126.98
Red marl	4.5'	421.13'	- 331.82'		128.36
Grey marl	2.5'	423.63'	- 334.32'		129.12
Red marl	9.0'	432.63'	- 343.32'		131.86
ROCK SALT	73.5'	506.13'	- 416.82'		154.26
ROCK SALT with marl	13.5'	519.63'	- 430.32'		158.38
Hard grey marl & ROCKSALT	49.0'	568.63'	- 479.32'		173.31
ROCK SALT & marl	30.0'	598.63'	- 509.32'		182.46

Released from confidential cover
for better than the

CHESHIRE

34 34NE 1 7

Brine & Water Works
Holford.**CONFIDENTIAL**

6.4

H. 130 STRATA

3 JUNE / 73

[SJ 71347475]

Description of Strata	Thickness	Depth from Surface
Dugwell	10'-0"	10'-0"
Red Clay	7'-0"	17'-0"
Sand and Gravel	8'-0"	25'-0"
Red Clay and Gravel	11'-0"	36'-0"
Red Clay	5'-0"	41'-0" <i>Drift</i>
Red Clay and Gravel	6'-0"	47'-0" ←
Red Marl with Gravel	5'-0"	52'-0"
Red Marl with Gypsum	5'-0"	57'-0"
Red and Grey Marl with Gypsum	4'-6"	61'-6"
Red Marl with Gypsum	5'-0"	66'-6"
Red and Grey Marl with Gypsum	2'-6"	69'-0"
Red Marl with Gypsum	5'-0"	74'-0"
Red and Grey Marl with Gypsum	7'-0"	81'-0"
Red Marl with Gypsum	7'-6"	88'-6"
Red and Grey Marl with Gypsum	7'-0"	95'-6"
Grey Marl with Gypsum	2'-6"	98'-0"
Red Marl with Gypsum	5'-0"	103'-0"
Red and Grey Marl with Gypsum	10'-0"	113'-0"
Red Marl with Gypsum	6'-0"	119'-0"
Red and Grey Marl with Gypsum	7'-0"	126'-0"
Grey Marl with Gypsum	6'-0"	132'-0"
Red and Grey Marl with Gypsum	6'-0"	138'-0"
Grey Marl with Gypsum	12'-0"	150'-0"
Red and Grey Marl with Gypsum	2'-0"	152'-0"
Red Marl with Gypsum	4'-0"	156'-0"
Red and Grey Marl with Gypsum	4'-0"	160'-0"
Core worn away	82'-0"	242'-0"
Grey Marl and Gypsum	5'-6"	247'-6"
Red and Grey Marl with Gypsum	5'-0"	252'-6"
Grey Marl with Gypsum	5'-0"	257'-6"
Red Marl with Gypsum	4'-6"	262'-0"
Red and Grey Marl with Gypsum	2'-6"	264'-6"
Grey Marl with Gypsum	1'-6"	266'-0"
Red Marl with Gypsum	6"	266'-6"
Grey Marl with Gypsum	4'-0"	270'-6"
Red and Grey Marl	1'-6"	272'-0"
Red and Grey Marl with Salt Pockets	2'-0"	274'-0"
Grey Marl	2'-6"	276'-6"
Red and Grey Marl with Gypsum	5'-6"	282'-0"
Red and Grey Marl	3'-0"	285'-0"
R.H. Red and Grey Marl washed away	7'-0"	292'-0"
- Salt Rock with Marl	-2'-0"	294'-0"
- Salt Rock	-24'-0"	318'-0"
Red and Grey Marl	6"	318'-6"
- Salt Rock	-7'-6"	326'-0"
- Salt Rock with Marl	-1'-0"	327'-0"
Red and Grey Marl with Salt Veins	1'-6"	328'-6"
Grey Marl with Salt Veins	# 2'-6"	331'-0"
- Salt Rock with Grey Marl	-3'-6"	334'-6"
- Salt Rock	-20'-0"	354'-6"
Red and Grey Marl with Red Salt	1'-6"	356'-0"

Salt Rock

3'-0"

359'-0"

British Geological Survey

British Geological Survey

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-2- ³⁵ SJ77 SW64

Description of Strata	Thickness	Depth from Surface
- Salt Rock with Marl	- 5'-0"	364'-0"
- Salt Rock	- 8'-0"	372'-0"
Red Marl	3"	372'-3"
Grey Marl	3"	372'-6"
Salt Rock	- 2'-0"	374'-6"
Salt Rock with Marl	- 4'-0"	378'-6"
Salt Rock	- 64'-0"	442'-6"
Salt Rock with Marl	- 1'-3"	443'-9"
Grey Marl with Red Salt	3"	444'-0"
Red and Grey Marl with Red Salt	2'-0"	446'-0"
Red Marl with Red Salt	5'-0"	451'-0"
Salt Rock	- 1'-0"	452'-0"
Red and Grey Marl	4'-0"	456'-0"
Grey Marl	1'-0"	457'-0"
Red and Grey Marl with Salt Rock	6"	457'-6"
Grey Marl with Red Salt	1'-0"	458'-6"
Red and Grey Marl with Red Salt	1'-0"	459'-6"
Red Marl with Red Salt	5'-3"	464'-9"
Salt Rock	- 5'-6"	470'-3"
Grey Marl	3"	470'-6"
Salt Rock	- 3"	470'-9"
Grey Marl with Red Salt	- 2'-6"	473'-3"
Salt Rock	- 2'-6"	475'-9"
Red and Grey Marl	1'-0"	476'-9"
Red Marl with Red Salt	3'-6"	480'-3"
Salt Rock	- 4'-0"	484'-3"
Marly Rock	- 9"	485'-0"
Grey Marl	3"	485'-3"
Marly Rock	- 6"	485'-9"
Grey Marl with Salt	1'-6"	487'-3"
Salt Rock	- 5'-0"	492'-3"
Red Marl with Salt Veins	6"	492'-9"
Red Salt	3"	493'-0"
Red and Grey Marl	1'-0"	494'-0"
Red Marl with Red Salt	2'-0"	496'-0"
Marly Rock	- 1'-0"	497'-0"
Salt Rock	- 39'-0"	536'-0"
Salt Rock with Grey Marl	- 1'-0"	537'-0"
Salt Rock	- 7'-0"	544'-0"
Grey Marl with Salt Veins	1'-0"	545'-0"
Grey Marl	1'-6"	546'-6"
Red Marl	6'-0"	552'-6"
Red and Grey Marl	5'-0"	557'-6"
Grey Marl	2'-6"	560'-0"
Marly Rock	- 1'-6"	561'-6"
Grey Marl	2'-0"	563'-6"
Red Marl with Red Salt	4'-6"	568'-0"
Red and Grey Marl	5'-0"	573'-0"
Grey Marl with Red Salt	1'-6"	574'-6"
Red and Grey Marl with Red Salt	6"	575'-0"
Salt Rock with Marl	- 5'-0"	580'-0"
Salt Rock	- 78'-0"	658'-0"
Grey Marl	6"	658'-6"
Red Marl with Red Salt	5'-3"	663'-9"
Red and Grey Marl with Salt	9"	664'-6"

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Description of Strata	Thickness	Depth from Surface
Salt Rock with Grey Marl	- 1'-3"	675'-0"
Red and Grey Marl with Red Salt	2'-0"	677'-0"
Marly Rock	- 23'-0"	700'-0"
Salt Rock	- 11'-6"	711'-6"
Grey Marl with Salt Veins	1'-6"	713'-0"
Salt Rock	- 1'-0"	714'-0"
Marly Rock	- 4'-0"	718'-0"
Salt Rock	- 11'-0"	729'-0"
Marly Rock	- 6'-6"	735'-6"
Red Marl with Salt Pockets	3"	735'-9"
Salt Rock	- 1'-0"	736'-9"
Red and Grey Marl with Salt	6"	737'-3"
Salt Rock	- 12'-3"	749'-6"
Marly Rock	- 5'-0"	754'-6"
Salt Rock	- 94'-0"	848'-6"
Marly Rock	- 4'-9"	853'-3"
Red Marl with Salt Pockets	9"	854'-0"
Red and Grey Marl with Salt Pockets	7'-0"	861'-0"
Grey Marl with Red Salt	1'-0"	862'-0"
Red and Grey Marl	3"	862'-3"
Grey Marl with Red Salt	1'-0"	863'-3"
Red and Grey Marl with Red Salt	1'-0"	864'-3"
Red Marl with Red Salt	6'-0"	870'-3"
Red and Grey Marl with Salt Pockets	5'-6"	875'-9"
Salt Rock with Grey Marl	- 3'-3"	879'-0"
Red Marl	3'-6"	882'-6"
Salt Rock	- 14'-6"	897'-0"
Marly Rock	- 9'-0"	906'-0"
Salt Rock	- 72'-6"	978'-6"
Grey Marl with Salt Rock	1'-0"	979'-6"
Red Marl with Red Salt	4'-6"	984'-0"
Marly Rock	- 2'-0"	986'-0"
Salt Rock	- 1'-0"	987'-0"
Red and Grey Marl with Salt	4'-6"	991'-6"
Salt Rock	- 2'-0"	993'-6"
Grey Marl with Salt Rock	1'-0"	994'-6"
Salt Rock	- 3'-0"	997'-6"
Red and Grey Marl with Salt	1'-0"	998'-6"
Red and Grey Marl	1'-6"	1000'-0"
Grey Marl	1'-6"	1001'-6"
Red and Grey Marl	2'-0"	1003'-6"
Red Marl with Red Salt	2'-0"	1005'-6"
Red and Grey Marl with Red Salt	3'-0"	1008'-6"
Red Marl	3'-0"	1011'-6"
Red and Grey Marl with Salt	1'-0"	1012'-6"
Marly Rock	- 4'-0"	1016'-6"
Salt Rock	- 3'-0"	1019'-6"
Red and Grey Marl	2'-6"	1022'-0"
Red Marl with Salt Veins	5'-6"	1027'-6"
Marly Rock	- 3'-0"	1030'-6"
Salt Rock	- 11'-0"	1041'-6"
Red and Grey Marl with Red Salt	5'-0"	1046'-6"
Marly Rock	- 1'-0"	1047'-6"
Red and Grey Marl with Salt	5'-6"	1053'-0"

30'
Halt



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Description of Strata	Thickness	Depth from Surface
Red and Grey Marl	11'-0"	1076'-0"
Red Marl	3'-6"	1079'-6"
Red and Grey Marl	2'-6"	1082'-0"

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Sampling				Strata				
Depth	Type	Casing Depth	Date/ Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend
0.20	D		29/03 1993		Turf and Topsoil. (Topsoil)	G.L.	39.42	
0.20-0.45	B				MADE GROUND: Dark grey sandy clay with much brick and masonry fragments. [Made Ground] Firm becoming stiff grey-brown fissured sandy CLAY with a little gravel and grey silt on fissures. [Glacial Till]	0.20	39.22	
0.45	D					0.45	38.97	
0.50-0.95	B							
0.50-0.95	C							
1.40	D							
1.50-1.95	SD	1.00	DRY	6				
1.50-1.95	B							
2.40	D							
2.55-3.00	SD	2.00	DRY	6		(3.65)		
2.55-3.00	B				Below 2.40m: occasionally poorly laminated.			
3.40	D							
3.50-3.95	SD	3.00	DRY	7				
3.50-3.95	B							
4.10	D							
4.25-4.70	SD	4.00	DRY	16		4.10	35.32	
4.25-4.70	B				Firm to stiff dark brown sandy CLAY with a little fine and medium gravel. [Glacial Till]			
5.05	B							
5.15-5.60	SD	5.00	DRY	14				
5.15-5.60	B							
6.00	D							
6.15-6.60	SD	6.00	DRY	15		(3.60)		
6.15-6.60	B							
7.10	D							
7.15-7.60	SD	7.00	DRY	15				
7.15-7.60	B							
7.70	D							
7.90-8.35	SD	7.50	DRY	11		7.70	31.72	
7.90-8.35	B				Stiff dark brown thinly laminated slightly sandy very silty CLAY. [Glacial Laminated Clay]			
8.00	W							
8.75	D							
8.85	D					(1.60)		
9.00-9.45	SD	8.90	8.50	22				
9.00-9.45	B				At 8.85m: with lenses of sand and gravel. At 9.00m: with thin bands of clayey silt.			
9.80	D							
9.95-10.40	SD	9.60	9.00	27		9.30	30.12	
9.95-10.40	B				Stiff dark brown sandy very silty CLAY with traces of gravel. [Glacial Till]			
Equipment: Cable Percussive Boring Rig				Groundwater		Sealed		Ground Level Coordinates
Borehole Dia (mm) 150 to 26.10m				Casing Dia (mm) 150 to 22.50m		No. Struck Behaviour		39.421 m OD 113228.0 mE 93168.5 mN
				1 8.00 Rose to 7.50m in 20 minutes.		22.50		Drilled by BH Logged by JW Checked by
				2 15.10				
Remarks 1. Hard strata/Chiselling: 17.00m to 17.70m (2 hours).								
See key sheet and appendices for explanations.								
Borehole Record				Project			Contract	
Exploration Associates				M6 Widening Junctions 15 to 20 Department of Transport Motorway Widening Unit			D2200	
							Borehole	
							304 (1 of 3)	

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Sampling					Strata			
Depth	Type	Casing Depth	Date/Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend
9.95-10.40	B		29/03		(See previous sheet - sandy CLAY)			
10.90 11.00-11.45 11.00-11.45	D SD B	11.00	10.30	34				
11.90 12.05-12.50 12.05-12.50	D SD B	12.00	10.00	40		(5.80)		
12.90 13.10-13.45 13.10-13.60	D C B	13.00	12.00	78/ 150				
14.00 14.20-14.65 14.20-14.65	D C B	14.00	12.50	48				
14.65 14.90 15.00-15.45 15.00-15.45 15.10	D SD B U	14.50 14.50	12.00 30/03 10.20 13.00	18	Medium dense brown fine and medium SAND. [Glacial Sand and Gravel]	15.10 15.35	24.32 24.07	
15.90 16.00-16.45 16.00-16.45	D C B	15.90	14.00	13	Firm to stiff dark brown very sandy CLAY with traces of gravel. [Glacial Till]	(1.15)		
16.50 16.60-17.05 16.60-17.05	D SD B	16.50	13.80	25	Firm to stiff brown thinly laminated very silty CLAY. Silt on laminae. [Glacial laminated clay]	16.50 (0.40)	22.92	
17.05-17.15 17.05-17.60	C B	17.00	15.00	78*/ 100	Stiff dark brown very sandy CLAY with some fine to coarse gravel. [Glacial Till]	16.90	22.52	
17.70 17.80-18.25 17.80-18.25	D C B	17.50	16.00	30	From 16.90m to 17.60m: with frequent cobbles and small boulders.			
18.65 18.75-19.20 18.75-19.20	D C B	18.50	16.00	36				
19.70 19.80-20.25 19.80-20.20	D C B	19.60	17.40	39				
Equipment: Cable Percussive Boring Rig					Groundwater No. Struck Behaviour		Sealed	Ground Level Coordinates 39.421 m OD 113228.0 93168.5 mE mN
Borehole Dia (mm) 150 to 26.10m		Casing Dia (mm) 150 to 22.50m		British Geological Survey				
Drilled by RH					Logged by JW			
Checked by								
Remarks								
See key sheet and appendices for explanations.								
Borehole Record					Project		Contract	
Exploration Associates					M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit		02200	
					Borehole		304(2 of 3)	

Sampling					Strata				
Depth	Type	Casing Depth	Date/Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend	
			30/03		(See previous sheet - sandy CLAY)				
20.70 20.85-21.30 20.85-21.30	D C B	20.50	18.00	49	Below 21.00m: becoming very stiff.	(7.70)			
21.60 21.75-22.20 21.75-22.20	D C B	21.50	20.00	89					
22.60 22.75-23.20 22.75-23.20	D C B	22.50	DRY	60					
23.65 23.80-24.25 23.80-24.25	D C B	22.50	DRY	49					
24.55 24.60 24.75-25.20	D D SD	22.50	DRY	76	Red-brown thinly and thickly laminated silty MUDSTONE with frequent sub-horizontal discontinuous gypsum bands. (Mercia Mudstone WG IV)	24.60	14.82		
25.60 25.65-26.10 25.65-26.10	D SD D	22.50	DRY	76					
26.10			22.50	26.10	End of Borehole.	26.10	13.32		
Equipment: Cable Percussive Boring Rig					Groundwater No. Struck Behaviour		Sealed		Ground Level Coordinates 39,421 m 00 113228,0 mE 93168.5 mN
Borehole Dia (mm) 150 to 26.10m		Casing Dia (mm) 150 to 22.50m		British Geological Survey					Drilled by BH Logged by JW Checked by
Remarks See key sheet and appendices for explanations.									
Borehole Record			Project			Contract			
Exploration Associates			M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit			D2200			
						Borehole 304 (3 of 3)			

Appendix C

Geological Logs for Plumley PSD (2014)



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372293 N 374177	Hole Type DS+RC
Location: Plumley, Cheshire		Level: 30.19mAOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 13/03/2014 to: 13/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1	1	B	0.00 - 0.20	0		0.20	29.99	Grass over dark brown clayey SAND. Sand is fine to medium (TOPSOIL).	
		ES	0.20 - 0.40			(1.00)	28.99	Firm dark reddish brown slightly gravelly sandy silty CLAY. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).	
		B	0.40 0.50 - 0.90					0.9 m bgl becoming very soft	
2		U70	3.00 - 3.45	N=10		1.20	28.99	Very soft reddish brown slighty gravelly very sandy silty CLAY. Sand is coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).	
						1.50	28.69	Soft locally firm dark reddish brown sandy silty CLAY. Sand is coarse (GLACIAL TILL).	
3		U70	3.00 - 3.45	N=27		2.20	27.99	Firm dark reddish brown slightly gravelly very sandy silty CLAY. Sand is coarse. Gravel is angular to sub-angular fine to medium of sandstone, flint and quartz (GLACIAL TILL).	
						(1.30)			
4		U70	3.00 - 3.45	N=27		3.50	26.69	Medium dense dark reddish brown slightly silty SAND. Sand is coarse (GLACIAL TILL).	
						(0.50)			
4						4.00	26.19	Borehole completed at 4.00m	4.00

REMARKS:

Hand pit from GL to 1.10m bgl.
Groundwater encountered at 0.90m bgl.
Hole collapsed at 3.00m bgl, casing added.
Hole terminated at 4.00m bgl as casing could not be progressed further.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:	
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Terrier 2002	Borehole Diameter:	Screen Material:	Screen Diameter:	m bgl: Meters below ground level
13/03/14	0.90			Screen Slot Size:	Sand Particle Size:			m AOD: Meters above ordanace datum
								NVO: No visual or olfactory evidence of contamination
								Water Strike Level
								Water Rest Level



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372689 N 373922	Hole Type DS+RC
Location: Plumley, Cheshire		Level: 33.68m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 14/03/2014 to: 14/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		B ES	0.00 - 0.40			0.90	32.78	Firm dark brown mottled grey sandy silty CLAY. Sand is fine to medium (GLACIAL TILL).	
		B	0.40 - 0.50	0					
		B	0.50 - 0.70	0					
		B ES	0.70 - 0.90	0					
2		B	0.90 - 1.20	0		4.10	Firm dark reddish brown mottled grey slightly gravelly sandy clayey SILT with occasional pockets of grey coarse sand. Gravel is angular to sub-angular fine to coarse of sandstone, flint and quartz (GLACIAL TILL).		
		B	1.20 - 2.00	N=17					
3		U100	2.00 - 3.00	N=17		5.00	28.68	Stiff reddish brown slightly sandy silty CLAY. Sand is medium to coarse (GLACIAL TILL).	
		B	3.00 - 3.50	N=14					
4		B	4.00 - 5.00	N=14		6.30	27.38	4.0 m bgl becoming soft	
		U100	5.00 - 5.50	N=32					
5		U100	5.00 - 5.50	N=32		6.50	27.18	6.0 m bgl becoming firm	
		B	6.50 - 7.00	N=21					
6		B	6.50 - 7.00	N=21		7.50	21.80	Dark reddish brown silty clayey slightly gravelly SAND. Sand is coarse. Gravel is angular to sub-angular medium to coarse of flint and quartz (GLACIAL TILL).	
		B	7.00 - 7.50	N=21					
7		B	7.50 - 8.00	N=21		8.40	21.80	Firm dark reddish brown slightly gravelly very sandy clayey SILT. Sand is coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).	
		B	8.00 - 8.40	N=21					
8									

REMARKS:

Hand pit from GL to 1.20m bgl.
 Groundwater encountered at 5.00m bgl.
 No visual or olfactory evidence of contamination.
 Hole terminated at 8.40m bgl due to time constraints.

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:	
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Comacchio 205	Borehole Diameter:	Screen Material:	Screen Diameter:	m bgl: Meters below ground level
14/03/14	5.00			Borehole Diameter:	Screen Material:	Screen Diameter:	Screen Slot Size:	m AOD: Meters above ordnance datum
				Screen Slot Size:	Sand Particle Size:			NVO: No visual or olfactory evidence of contamination
								Water Strike Level
								Water Rest Level





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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372689 N 373922	Hole Type DS+RC
Location: Plumley, Cheshire		Level: 33.68m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 14/03/2014 to: 14/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
				N=29		8.40	25.28	Borehole completed at 8.40m	8.40
9									
10									
11									
12									
13									
14									
15									
16									
17									

NOTE: PID results are reported as ppmv.

Groundwater: Date Strike Depth (m) Casing Depth (m) Depth After Observation (m)				Hole and Install Details: Drilling Method: Comacchio 205 Borehole Diameter: Screen Material: Screen Diameter: Screen Slot Size: Sand Particle Size:			Key: m bgl: Meters below ground level m AOD: Meters above ordnance datum NVO: No visual or olfactory evidence of contamination  Water Strike Level  Water Rest Level		
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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372750 N 373822	Hole Type DS+RC
Location: Plumley, Cheshire		Level: 34.34m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 12/03/2014 to: 13/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install	
		No/Type	Depth (m)	Result						
1		ES	0.00 - 0.20	0	[Symbol]	0.20	34.14	Firm grey mottled orange slightly sandy CLAY. Sand is fine to medium (GLACIAL TILL).	[Symbol]	
		B	0.50 - 0.70					Firm dark reddish brown mottled grey slightly gravelly sandy clayey SILT. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).		
2		B	1.20 - 2.00	N=16	[Symbol]				[Symbol]	
		U100	2.00 - 2.50							
3		B	3.00 - 4.00	N=12	[Symbol]			3.0 m becoming soft	[Symbol]	
							(6.30)			
4		U100	4.00 - 4.50		[Symbol]				[Symbol]	
5				N=18	[Symbol]			5.0 m becoming firm	[Symbol]	
		B	5.50 - 6.00							
6				N=29	[Symbol]				[Symbol]	
7				N=42	[Symbol]	6.50	27.84	Dense dark reddish brown slightly gravelly SAND. Sand is coarse. Gravel is angular to sub-rounded fine to coarse of flint and quartz (GLACIAL TILL).	[Symbol]	
							(0.70)			
8					[Symbol]	7.20	27.14	Firm dark reddish brown sandy silty CLAY. Sand is fine to medium (GLACIAL TILL).	[Symbol]	
							7.50	26.84		
								7.60		26.74

REMARKS:

Hand pit from GL to 1.20m bgl.
No groundwater encountered.
No visual or olfactory evidence of contamination.
Hole terminated at 9.50m bgl.

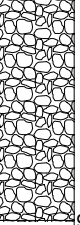
NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:	
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Comacchio 205	Borehole Diameter:	Screen Material:	Screen Diameter:	m bgl: Meters below ground level
				Screen Slot Size:	Sand Particle Size:			m AOD: Meters above ordnance datum
								NVO: No visual or olfactory evidence of contamination
								↓ Water Strike Level
								↓ Water Rest Level





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Project Name: Lindis	Project No: 51670-00	Co-ords: E 372750 N 373822	Hole Type DS+RC
Location: Plumley, Cheshire		Level: 34.34mAOD	Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 12/03/2014 to: 13/03/2014	Logged By PR
		Contractor: CCGI Ltd	Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
9		B	8.00 - 9.00	N=33	x x	1.90	24.84	Firm dark reddish brown slightly gravelly very sandy clayey SILT. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL). <i>(continued from previous sheet)</i>	
				N=27				9.0 m bgl becoming stiff	
10								Borehole completed at 9.50m	9.50
11									
12									
13									
14									
15									
16									
17									

NOTE: PID results are reported as ppmv.

Groundwater: Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
Hole and Install Details: Drilling Method: Comacchio 205 Borehole Diameter: Screen Material: Screen Diameter: Screen Slot Size: Sand Particle Size:			
Key: m bgl: Meters below ground level m AOD: Meters above ordnance datum NVO: No visual or olfactory evidence of contamination  Water Strike Level  Water Rest Level			



Project Name: Lindis	Project No: 51670-00	Co-ords: E 372882 N 373829	Hole Type DS+RC
Location: Plumley, Cheshire		Level: 33.44m AOD	Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 10/03/2014 to: 11/03/2014	Logged By PR
		Contractor: CCGI Ltd	Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		B	0.00 - 0.50		x			Firm locally soft dark reddish brown sandy clayey SILT with occasional thin layers (<10mm) of fine and medium sand in a soft grey clay matrix (GLACIAL TILL). 0.5 m bgl becoming slightly gravelly. Gravel is fine to medium angular to sub-angular of flint and quartz.	0.05
			0.50	0	x	(1.70)			0.50
				0.75	0	x			
				1.00	0	x			
			B U100	1.20 - 1.70		x			
			U100	1.70 - 2.20		x	1.70	31.74	
2								Firm dark reddish brown slightly gravelly sandy clayey SILT. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of sandstone and quartz (GLACIAL TILL).	
	3		B	2.70 - 3.70	N=15				
			U100	3.70 - 4.20			(4.00)		
4									
	5		B	4.70 - 5.70	N=13				4.7 m bgl becoming soft
6			B	5.70 - 6.70	N=23		5.70	27.74	Medium dense dark reddish brown slightly clayey gravelly SAND. Sand is coarse. Gravel is angular to sub-rounded fine to medium of flint and quartz (GLACIAL TILL).
7								Stiff dark reddish brown slightly silty slightly sandy CLAY. Sand is coarse (GLACIAL TILL).	
					N=42	6.70	26.74		
8								Dense dark reddish brown slightly silty clayey sandy GRAVEL. Sand is medium to coarse. Gravel is angular to sub-rounded fine to coarse of quartz and flint (GLACIAL TILL).	
					N=34	7.30	26.14		

REMARKS:

Hand pit from GL to 1.20m bgl.
Moderate water ingress at 6.0m bgl - casing needed from 6.0 to 10.0 m gl.
No visual or olfactory evidence of contamination.
Hole terminated at 10.00m bgl.

NOTE: PID results are reported as ppmv.

Groundwater: Date	Strike Depth (m) 6.00	Casing Depth (m)	Depth After Observation (m)	Hole and Install Details: Drilling Method: Comacchio 205 Borehole Diameter: Screen Material: Screen Diameter: Screen Slot Size: Sand Particle Size:	Key: m bgl: Meters below ground level m AOD: Meters above ordnance datum NVO: No visual or olfactory evidence of contamination Water Strike Level Water Rest Level
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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372882 N 373829	Hole Type DS+RC
Location: Plumley, Cheshire		Level: 33.44m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 10/03/2014 to: 11/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
9				N=28		8.30	25.14	Firm dark reddish brown slightly sandy slightly gravelly CLAY. Sand is coarse. Gravel is angular to sub-angular fine to medium of quartz and flint (GLACIAL TILL).	
				N=50		(1.70)	9.0 m bgl becoming stiff		
10						10.00	23.44	Borehole completed at 10.00m	10.00
11		B ES	1.00 - 1.201.00						
12									
13									
14									
15									
16									
17									

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:						
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Comacchio 205	Borehole Diameter:	Screen Material:	Screen Diameter:	Screen Slot Size:	Sand Particle Size:	m bgl: Meters below ground level	m AOD: Meters above ordnance datum	NVO: No visual or olfactory evidence of contamination	
											Water Strike Level		Water Rest Level



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372831 N 374319	Hole Type WLS
Location: Plumley, Cheshire		Level: 33.12m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 12/03/2014 to: 12/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		ES	0.00 - 0.20	0		(0.70)		Grass over dark brown silty clayey coarse SAND. Sand is fine to medium (TOPSOIL).	0.50
		B	0.70			0.70 (0.50)	32.42	Firm orangish brown slightly sandy silty CLAY. Sand is coarse (GLACIAL TILL).	
		U70	1.20 - 1.70			1.20 (0.80)	31.92	Firm dark reddish brown slightly sandy silty CLAY with frequent pockets (<10mm) of light grey fine to coarse sand (GLACIAL TILL).	
2				N=17		2.00	31.12	Borehole completed at 2.00m	2.00
3									
4									
5									
6									
7									
8									

REMARKS:

Windowless Sampling Hole.
Hand pit from GL to 1.20m bgl.
No groundwater encountered.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:	
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Terrier 2002	Borehole Diameter:	Screen Material:	Screen Diameter:	m bgl: Meters below ground level
				Screen Slot Size:	Sand Particle Size:			m AOD: Meters above ordnance datum
								NVO: No visual or olfactory evidence of contamination
								Water Strike Level
								Water Rest Level



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372797 N 373996	Hole Type WLS
Location: Plumley, Cheshire		Level: 34.58m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 12/03/2014 to: 12/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		B ES	0.00 - 0.40 0.00 - 0.20 0.20	0		(0.40) 0.40	34.18	Grass over firm dark yellowish brown slightly gravelly very sandy clayey SILT with frequent rootlets. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (TOPSOIL).	0.50
		B	0.40 - 0.60			(0.60)	Firm dark reddish brown slightly gravelly very sandy clayey SILT. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).		
		U70	1.20 - 1.70			1.00 1.20	33.58 33.38	Reddish brown silty clayey SAND. Sand is coarse (GLACIAL TILL). Firm slightly gravelly very sandy silty CLAY. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).	
		B	2.00	N=14		(0.80) 2.00	32.58	Borehole completed at 2.00m	2.00
2									
3									
4									
5									
6									
7									
8									

REMARKS:

Windowless Sampling Hole.
Hand pit from GL to 1.20m bgl.
Slight water seepage in base of hole.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater: Date Strike Depth (m) Casing Depth (m) Depth After Observation (m)				Hole and Install Details: Drilling Method: Terrier 2002 Borehole Diameter: Screen Material: Screen Diameter: Screen Slot Size: Sand Particle Size:			Key: m bgl: Meters below ground level m AOD: Meters above ordnance datum NVO: No visual or olfactory evidence of contamination Water Strike Level Water Rest Level		
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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372577 N 374042	Hole Type WLS
Location: Plumley, Cheshire		Level: 33.11mAOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 13/03/2014 to: 13/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install	
		No/Type	Depth (m)	Result						
1		ES	0.00 - 0.20	0		0.20	32.91	MADE GROUND: Grass over dark brown slightly sandy GRAVEL. Sand is medium to coarse. Gravel is angular and sub-angular fine to coarse of sandstone, flint and clinker. Firm dark reddish brown sandy silty CLAY. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of sandstone, flint and quartz (GLACIAL TILL). Firm dark reddish brown slightly gravelly sandy CLAY. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).		
		B	0.20 - 0.60			(0.55)	32.36			0.50
		ES	0.20 - 0.40			(1.70)				
2		U70	2.00 - 2.45	N=17		2.45	30.66	Borehole completed at 2.45m	2.45	
3										
4										
5										
6										
7										
8										

REMARKS:

 Windowless Sampling Hole.
 Hand pit from GL to 1.20m bgl.
 Slight water seepage in base of hole.
 No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater: Date Strike Depth (m) Casing Depth (m) Depth After Observation (m)				Hole and Install Details: Drilling Method: Terrier 2002 Borehole Diameter: Screen Material: Screen Diameter: Screen Slot Size: Sand Particle Size:			Key: m bgl: Meters below ground level m AOD: Meters above ordnance datum NVO: No visual or olfactory evidence of contamination Water Strike Level Water Rest Level		
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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372172 N 374288	Hole Type WLS
Location: Plumley, Cheshire		Level: 30.48m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 13/03/2014 to: 13/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		B	0.10 - 0.40	0		(0.70)	29.78	Grass over firm dark yellowish brown slightly gravelly very sandy clayey SILT with frequent rootlets. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (TOPSOIL).	0.50
			0.40			0.70 - 0.90		(1.75)	
2		U70	2.00 - 2.45	N=7		2.45	28.03	2.0 m bgl pseudo-fibrous peat (hydrogen sulphide odour)	2.45
3								Borehole completed at 2.45m	
4									
5									
6									
7									
8									

REMARKS:

Windowless Sampling Hole.
Hand pit from GL to 1.20m bgl.
No groundwater encountered.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:	
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Terrier 2002	Borehole Diameter:	Screen Material:	Screen Diameter:	m bgl: Meters below ground level
				Screen Slot Size:	Sand Particle Size:			m AOD: Meters above ordnance datum
								NVO: No visual or olfactory evidence of contamination
								Water Strike Level
								Water Rest Level



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372500 N 373920	Hole Type WLS
Location: Plumley, Cheshire		Level: 32.90m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 13/03/2014 to: 13/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		ES B	0.00 - 0.30 0.10 - 0.40 0.30	0		(0.45) 0.45	32.45	Grass over dark yellowish brown clayey SAND with occasional rootlets. Sand is coarse (TOPSOIL).	
		B	0.90 - 1.20	N=25		(2.00)		Firm dark reddish brown mottled grey slightly gravelly sandy clayey SILT. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint, quartz and sandstone (GLACIAL TILL).	
2		U70	2.00 - 2.45			2.45	30.45	Borehole completed at 2.45m	2.45
3									
4									
5									
6									
7									
8									

REMARKS:

Windowless Sampling Hole.
Hand pit from GL to 1.20m bgl.
Slight water seepage in base of hole.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:	
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Terrier 2002	Borehole Diameter:	Screen Material:	Screen Diameter:	m bgl: Meters below ground level
				Screen Slot Size:	Sand Particle Size:			m AOD: Meters above ordnance datum
								NVO: No visual or olfactory evidence of contamination
								Water Strike Level
								Water Rest Level



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372780 N 373650	Hole Type WLS
Location: Plumley, Cheshire		Level: 36.70m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 12/03/2014 to: 12/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
		ES	0.00 - 0.30						
			0.30	0		0.60			
1		B	0.70 - 1.00			0.60	36.10	0.50	
		U70	1.20 - 1.70			(1.40)			
2		B	1.70 - 2.00						
				N=23		2.00	34.70	2.00	
3									
4									
5									
6									
7									
8									

REMARKS:

Windowless Sampling Hole.
Hand pit from GL to 1.20m bgl.
Ceramic pipe noted in the eastern pit face.
No groundwater encountered.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
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Hole and Install Details:

Drilling Method: Terrier 2002
Borehole Diameter:
Screen Material:
Screen Diameter:
Screen Slot Size:
Sand Particle Size:

Key:

m bgl: Meters below ground level
m AOD: Meters above ordnance datum
NVO: No visual or olfactory evidence of contamination
 Water Strike Level
 Water Rest Level



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372528 N 373669	Hole Type WLS
Location: Plumley, Cheshire		Level: 36.19mAOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 13/03/2014 to: 13/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		B ES	0.00 - 0.30	0		0.30	35.89	Grass over dark yellowish brown very clayey coarse SAND with occasional rootlets. Sand is coarse (TOPSOIL).	
			0.30			(2.15)		Firm dark reddish brown mottled grey slightly gravelly sandy silty CLAY. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).	
2		U70	2.00 - 2.45	N=15		2.45	33.74	Borehole completed at 2.45m	
3									
4									
5									
6									
7									
8									

REMARKS:

Windowless Sampling Hole.
Hand pit from GL to 1.20m bgl.
Slight water seepage in base of hole.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:	
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Terrier 2002	Borehole Diameter:	Screen Material:	Screen Diameter:	m bgl: Meters below ground level
				Screen Slot Size:	Sand Particle Size:			m AOD: Meters above ordnance datum
								NVO: No visual or olfactory evidence of contamination
								Water Strike Level
								Water Rest Level



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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372746 N 373877	Hole Type WLS
Location: Plumley, Cheshire		Level: 34.02m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 12/03/2014 to: 12/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
1		ES	0.00 - 0.30			(2.20)	Firm dark orangish brown mottled grey sandy silty CLAY with frequent rootlets. Sand is coarse (GLACIAL TILL).		
			0.30	0					0.50
2		ES	1.20 - 1.40			2.20	1.1 m bgl Cobble of sub-angular quartz		
			1.40	0					2.20
3							Borehole completed at 2.20m		
4									
5									
6									
7									
8									

REMARKS:

Windowless Sampling Hole.
 Exploratory hole for land quality assessment.
 Hand pit from GL to 1.20m bgl.
 No groundwater encountered.
 No visual or olfactory evidence of contamination.


NOTE: PID results are reported as ppmv.

Groundwater: Date Strike Depth (m) Casing Depth (m) Depth After Observation (m)				Hole and Install Details: Drilling Method: Terrier 2002 Borehole Diameter: Screen Material: Screen Diameter: Screen Slot Size: Sand Particle Size:			Key: m bgl: Meters below ground level m AOD: Meters above ordnance datum NVO: No visual or olfactory evidence of contamination Water Strike Level Water Rest Level	
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Project Name: Lindis		Project No: 51670-00	Co-ords: E 372810 N 373796	Hole Type TP
Location: Plumley, Cheshire		Level: 36.35m AOD		Scale 1 : 50.00
Client: ESSAR Oil (UK) Ltd		Dates: 12/03/2014 to: 12/03/2014		Logged By PR
		Contractor: CCGI Ltd		Checked By RE

(m)	Water Levels	Samples & In Situ Testing			Legend	Depth (m)	Level (mAD)	Description	Install
		No/Type	Depth (m)	Result					
		ES	0.00 - 0.30				Firm dark reddish brown mottled slightly gravelly sandy CLAY. Sand is medium to coarse. Gravel is angular to sub-angular fine to medium of flint and quartz (GLACIAL TILL).		
1			0.30	0	(1.00)	1.00	Borehole completed at 1.00m	1.00	
2									
3									
4									
5									
6									
7									
8									

REMARKS:

Hand Pit.
Original set-out location buried under stockpile - alternative location used. Changed to hand pit as not cleared by utility clearance contractor.
Exploratory hole for land quality assessment.
Slight water seepage in base of hole.
No visual or olfactory evidence of contamination.

NOTE: PID results are reported as ppmv.

Groundwater:				Hole and Install Details:			Key:
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Drilling Method: Hand Pit	Borehole Diameter:	Screen Material:	m bgl: Meters below ground level
				Screen Diameter:	Screen Slot Size:	Sand Particle Size:	m AOD: Meters above ordnance datum
							NVO: No visual or olfactory evidence of contamination
							↓ Water Strike Level
							↓ Water Rest Level

Appendix D

Envirocheck Report, 2014

Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

53976325_1_1

Customer Reference:

Project Lindis

National Grid Reference:

372770, 373850

Slice:

A

Site Area (Ha):

3.5

Search Buffer (m):

1000

Site Details:

Project Delicious, Cape of Good Hope Farm

Back Lane, Plumley

KNUTSFORD

Cheshire

WA16 9SJ

Client Details:

Mrs T Forkes

Worley Parsons Ltd

Moorfield Court

11a Alma Road

Leeds

LS6 2AH

Prepared For:

ESSAR Oil (UK) Ltd

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Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Report Version v47.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1			2	17
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls					
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 5		Yes		
Pollution Incidents to Controlled Waters	pg 5			1	10
Prosecutions Relating to Authorised Processes					
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances					
River Quality	pg 7				2
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 8				6 (*8)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 11	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 11	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 11	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Detailed River Network Lines	pg 11		Yes	Yes	n/a
Detailed River Network Offline Drainage	pg 13		Yes	Yes	n/a

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Recorded Landfill Sites					
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)	pg 15		2	1	
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents	pg 15	1			
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 16	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 16	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites					
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
Brine Compensation Area	pg 25	Yes	n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability	pg 25	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 25	Yes		n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 25	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 25	Yes		n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 25	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 25	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 25	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries					n/a
Fuel Station Entries	pg 27				1
Sensitive Land Use					
Areas of Adopted Green Belt	pg 28			1	
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 28	1			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	<p>Discharge Consents</p> <p>Operator: A B Pickering Property Type: Sewage Disposal Works - Other Location: Orchard Barn, Nether Peover, Knutsford, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 016891777 Permit Version: 2 Effective Date: 30th May 1995 Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Peaver Eye Brook Status: Post National Rivers Authority Legislation where issue date > 31/08/1989 Positional Accuracy: Located by supplier to within 100m</p>	A12NE (W)	402	1	372220 373850
1	<p>Discharge Consents</p> <p>Operator: A B Pickering Property Type: Sewage Disposal Works - Other Location: Orchard Barn, Nether Peover, Knutsford, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016891777 Permit Version: 1 Effective Date: 1st January 1995 Issued Date: Not Supplied Revocation Date: 29th May 1995 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Peaver Eye Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A12NE (W)	402	1	372220 373850
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 8 Effective Date: 1st January 2010 Issued Date: 14th October 2008 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 7 Effective Date: 13th September 1994 Issued Date: 13th September 1994 Revocation Date: 31st December 2009 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Post National Rivers Authority Legislation where issue date > 31/08/1989 Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 016810098 Permit Version: 1 Effective Date: 12th January 1980 Issued Date: Not Supplied Revocation Date: 30th January 1985 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 2 Effective Date: 31st January 1985 Issued Date: Not Supplied Revocation Date: 12th October 1989 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 3 Effective Date: 13th October 1989 Issued Date: Not Supplied Revocation Date: 8th November 1989 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 4 Effective Date: 9th November 1989 Issued Date: Not Supplied Revocation Date: 31st March 1992 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 5 Effective Date: 1st April 1992 Issued Date: Not Supplied Revocation Date: 7th June 1992 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 6 Effective Date: 8th June 1992 Issued Date: Not Supplied Revocation Date: 12th September 1994 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	507	1	373400 373660
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 8 Effective Date: 1st January 2010 Issued Date: 14th October 2008 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	510	1	373405 373665
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 016810098 Permit Version: 7 Effective Date: 13th September 1994 Issued Date: 13th September 1994 Revocation Date: 31st December 2009 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Post National Rivers Authority Legislation where issue date > 31/08/1989 Positional Accuracy: Located by supplier to within 100m</p>	A14SW (E)	510	1	373405 373665

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 4 Effective Date: 9th November 1989 Issued Date: Not Supplied Revocation Date: 31st March 1992 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	510	1	373405 373665
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 5 Effective Date: 1st April 1992 Issued Date: Not Supplied Revocation Date: 7th June 1992 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	510	1	373405 373665
2	<p>Discharge Consents</p> <p>Operator: United Utilities Water Plc Property Type: Sewage Disposal Works - Water Company Location: Nether Peover Stw, Nether Peover, Cheshire Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016810098 Permit Version: 6 Effective Date: 8th June 1992 Issued Date: Not Supplied Revocation Date: 12th September 1994 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Trib Crow Brook Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m</p>	A14SW (E)	510	1	373405 373665
3	<p>Discharge Consents</p> <p>Operator: Flame Estates Developments Llp Property Type: Sewage Disposal Works - Other Location: Merry Farm, Lower Peover, Nr Knutsford, Cheshire, Wa16 9sb Authority: Environment Agency, North West Region Catchment Area: Peover Eye Reference: 016892316 Permit Version: 1 Effective Date: 8th December 2004 Issued Date: 8th December 2004 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Peover Eye Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m</p>	A19SW (NE)	687	1	373350 374380

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	Discharge Consents Operator: Contracts Administration Property Type: Sewage Disposal Works - Other Location: Moss Farm, Plumley, Cheshire Authority: Environment Agency, North West Region Catchment Area: Lower Mersey Reference: 016890424 Permit Version: 1 Effective Date: 30th January 1985 Issued Date: Not Supplied Revocation Date: 1st October 1996 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Peover Eye Status: Lapsed (under Environment Act 1995, Schedule 23) Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	956	1	372130 374750
4	Discharge Consents Operator: Serco Gulf Engineering Ltd Property Type: Sewage Disposal Works - Other Location: Moss Farm, Plumley, Cheshire Authority: Environment Agency, North West Region Catchment Area: Lower Mersey Reference: 016890425 Permit Version: 1 Effective Date: 30th January 1985 Issued Date: Not Supplied Revocation Date: 1st June 1997 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Into And/Or Watercourse Environment: Receiving Water: Eover Eye Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m	A17NE (NW)	956	1	372130 374750
4	Discharge Consents Operator: Serco Gulf Engineering Ltd Property Type: Sewage Disposal Works - Other Location: Moss Farm, Plumley, Cheshire Authority: Environment Agency, North West Region Catchment Area: Lower Mersey Reference: 016890426 Permit Version: 1 Effective Date: 30th January 1985 Issued Date: Not Supplied Revocation Date: 1st June 1997 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Into And/Or Watercourse Environment: Receiving Water: Eover Eye Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m	A17NE (NW)	956	1	372130 374750
	Nearest Surface Water Feature	A13SE (E)	11	-	372930 373825
5	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Cheshire Authority: Environment Agency, North West Region Pollutant: Unknown Note: Bradshaw Brook Tributary; None Pollution Found Incident Date: 11th September 1995 Incident Reference: 95522292 Catchment Area: Wincham Brook Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NE (S)	431	1	372800 373300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Cheshire Authority: Environment Agency, North West Region Pollutant: Oils - Kerosene Fuel Oil Note: Bradshaw Brook; Oil Incident Date: 3rd January 1996 Incident Reference: 96520013 Catchment Area: Wincham Brook Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NE (S)	530	1	372800 373200
7	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 12th December 1995 Incident Reference: 95522971 Catchment Area: Wincham Brook Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (S)	551	1	372700 373200
8	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Unknown Note: Bradshaw Brook Incident Date: 11th April 1995 Incident Reference: 95520779 Catchment Area: Weaver Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	647	1	372700 373100
8	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Unknown Note: Bradshaw Brook Incident Date: 30th April 1995 Incident Reference: 95520973 Catchment Area: Weaver Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	652	1	372700 373095
9	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Cheshire Authority: Environment Agency, North West Region Pollutant: Oils - Gas Oil Note: Peover Eye; Gas Oil Incident Date: 11th January 1996 Incident Reference: 96520048 Catchment Area: Wincham Brook Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18NE (N)	669	1	372900 374600
10	Pollution Incidents to Controlled Waters Property Type: Transport, Storage, Communications: Road Location: River Peaover, Eye Back Lane, LOWER PEAOVER, Cheshire Authority: Environment Agency, North West Region Pollutant: Organic Chemicals : Petroleum Spirits Note: Not Supplied Incident Date: 28th October 1999 Incident Reference: 33602 Catchment Area: Weaver Receiving Water: River Stretch (Freshwater) Cause of Incident: Accident Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A19SW (NE)	674	1	373300 374400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
11	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Kerosene Fuel Oil Note: Bradshaw Brook Incident Date: 7th July 1995 Incident Reference: 95521668 Catchment Area: Weaver Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	744	1	372700 373000
12	Pollution Incidents to Controlled Waters Property Type: Farm Drainage Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Organic Wastes: Silage Liquor Note: Peover Eye Incident Date: 22nd June 1995 Incident Reference: 95521502 Catchment Area: Weaver Receiving Water: Not Given Cause of Incident: Leaking Tank Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A9NE (SE)	755	1	373600 373500
13	Pollution Incidents to Controlled Waters Property Type: Boats/Ships Location: Cheshire Authority: Environment Agency, North West Region Pollutant: Unknown Note: None Found Incident Date: 2nd August 1994 Incident Reference: 94521776 Catchment Area: Wincham Brook Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SE (S)	765	1	373100 373000
14	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Cheshire Authority: Environment Agency, North West Region Pollutant: Unknown Note: None Affected; Diesel Reported Incident Date: 22nd November 1996 Incident Reference: 96522398 Catchment Area: Weaver Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A9SW (SE)	802	1	373200 373000
	River Quality Name: Wincham Bk GQA Grade: River Quality B Reach: Qs1 At Siddington To Smoker Bk Estimated Distance (km): 21 Flow Rate: Flow less than 1.25 cumecs Flow Type: River Year: 2000	A18SE (N)	592	1	372924 374508
	River Quality Name: Redlion (Wade) Bk GQA Grade: River Quality C Reach: Jodrell Bank To Near Millgate Farm Estimated Distance (km): 10 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A8SE (S)	781	1	372857 372946

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
15	Water Abstractions Operator: J & P Naylor Licence Number: 2568003103 Permit Version: 100 Location: Peover Eye At Fields Farm, Lower Peover Authority: Environment Agency, North West Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): 327 Yearly Rate (m3): 4546 Details: Fields Farm, Lower Peover Authorised Start: 01 May Authorised End: 30 September Permit Start Date: 8th December 1976 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A18SE (N)	620	1	373000 374500
16	Water Abstractions Operator: Mr Ri Williamson Licence Number: 2568003114 Permit Version: 101 Location: Peover Eye At The Grange, Plumley Authority: Environment Agency, North West Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises At The Grange, Plumley Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 25th September 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A18NE (N)	643	1	372800 374600
16	Water Abstractions Operator: Mr Ri Williamson Licence Number: 2568003114 Permit Version: 101 Location: Peover Eye At The Grange, Plumley Authority: Environment Agency, North West Region Abstraction: General Agriculture: Transfer Between Sources Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises At The Grange, Plumley Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 25th September 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A18NE (N)	643	1	372800 374600
16	Water Abstractions Operator: J Williamson & Sons Licence Number: 2568003114 Permit Version: 100 Location: Peover Eye At The Grange, Plumley Authority: Environment Agency, North West Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): 364 Yearly Rate (m3): 9092 Details: Premises At The Grange, Plumley Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 21st November 1980 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A18NE (N)	643	1	372800 374600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
16	Water Abstractions Operator: J Williamson & Sons Licence Number: 2568003114 Permit Version: 100 Location: Peover Eye At The Grange, Plumley Authority: Environment Agency, North West Region Abstraction: General Agriculture: Transfer Between Sources Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): 364 Yearly Rate (m3): 9092 Details: Premises At The Grange, Plumley Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 21st November 1980 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A18NE (N)	643	1	372800 374600
17	Water Abstractions Operator: J A & P A Naylor Licence Number: 2568003103 Permit Version: Not Supplied Location: Peover Eye At, Fields Farm, Lower Peover Authority: Environment Agency, North West Region Abstraction: Agricultural Spray Irrigation (Summer) Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 327 Yearly Rate (m3): 4546 Details: Additional Purpose: Licence Status: Cancelled Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A19SE (NE)	877	1	373600 374400
	Water Abstractions Operator: C M Shaw Licence Number: 2568003061 Permit Version: 100 Location: Spring Fed Catchpit At Merry Farm, Plumley, Knu Authority: Environment Agency, North West Region Abstraction: General Agriculture; General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 14 Yearly Rate (m3): 4546 Details: Merry Farm, Plumley, Knutsford Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 3rd May 1995 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A25SW (NE)	1374	1	373800 374900
	Water Abstractions Operator: C M Shaw Licence Number: 2568003061 Permit Version: 100 Location: Well At Merry Farm, Plumley Authority: Environment Agency, North West Region Abstraction: General Agriculture; General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 0 Yearly Rate (m3): 0 Details: Merry Farm, Plumley, Knutsford Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 3rd May 1995 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A25NW (NE)	1673	1	373900 375200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Ineos Enterprises Limited Licence Number: 2568003087 Permit Version: 103 Location: Holford Ditch & Holford Moss, Tribsof The Peover Eye, Bucklow Authority: Environment Agency, North West Region Abstraction: Chemicals: Process Water Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises At Rudheath & Lostockgralam Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 13th September 2005 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A16NW (NW)	1786	1	371100 374800
	Water Abstractions Operator: Ineos Chlor Enterprises Ltd Licence Number: 2568003087 Permit Version: 102 Location: Holford Ditch & Holford Moss, Tribsof The Peover Eye, Bucklow Authority: Environment Agency, North West Region Abstraction: Chemicals: Process Water Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises At Rudheath & Lostockgralam Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 2004 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A16NW (NW)	1786	1	371100 374800
	Water Abstractions Operator: Ineos Chlor Ltd Licence Number: 2568003087 Permit Version: 101 Location: Holford Ditch & Holford Moss, Tribsof The Peover Eye, Bucklow Authority: Environment Agency, North West Region Abstraction: Chemicals: Process Water Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises At Rudheath & Lostockgralam Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 9th January 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A16NW (NW)	1786	1	371100 374800
	Water Abstractions Operator: I C I Chemicals & Polymers Ltd Licence Number: 2568003087 Permit Version: 100 Location: Holford Ditch & Holford Moss, Tribsof The Peover Eye, Bucklow Authority: Environment Agency, North West Region Abstraction: Chemicals: Process Water Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 5001 Yearly Rate (m3): 1000120 Details: Premises At Rudheath & Lostockgralam Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 30th March 1990 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A16NW (NW)	1786	1	371100 374800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Vale Royal Fresh Foods Limited Licence Number: 2568002175 Permit Version: 101 Location: Manhole Fed By M6 Motorway Culvert, Allostock Authority: Environment Agency, North West Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises At Hulme Hall Lane, Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 6th August 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(S)	1842	1	373100 371900
	Water Abstractions Operator: Mr L H Skelton Licence Number: 2568002175 Permit Version: 100 Location: Manhole Fed By M6 Motorway Culvert, Allostock Authority: Environment Agency, North West Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 227 Yearly Rate (m3): 4546 Details: Premises At Hulme Hall Lane, Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 3rd November 1977 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(S)	1842	1	373100 371900
	Groundwater Vulnerability Soil Classification: Not classified Map Sheet: Sheet 16 West Cheshire Scale: 1:100,000	A13NW (N)	0	1	372774 373849
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Desination: Unproductive Strata	A13NW (N)	0	2	372774 373849
	Superficial Aquifer Designations Aquifer Designation: Unproductive Strata	A13NW (N)	0	2	372774 373849
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
18	Detailed River Network Lines River Type: Tertiary River River Name: Drain Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A13SW (SW)	35	1	372630 373774

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
19	Detailed River Network Lines River Type: Tertiary River River Name: Drain Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A13NE (N)	141	1	372828 374050
20	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A13NW (N)	208	1	372647 374173
21	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A13NW (NW)	209	1	372624 374170
22	Detailed River Network Lines River Type: Tertiary River River Name: Drain Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A13NW (NW)	237	1	372548 374165
23	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A12NE (NW)	283	1	372418 374077
24	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A12NE (NW)	314	1	372421 374146

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
25	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A17SE (NW)	344	1	372423 374196
26	Detailed River Network Lines River Type: Tertiary River River Name: Drain Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A17SE (NW)	392	1	372436 374274
27	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D011	A13NE (NE)	201	1	372938 374060
28	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D011	A13NE (NE)	202	1	372924 374069
29	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D011	A13NE (NE)	207	1	372939 374066
30	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D011	A8NE (SE)	279	1	372939 373459
31	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D011	A14SW (E)	329	1	373255 373832
32	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D011	A14NW (E)	422	1	373343 373907

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: Vale Royal Borough Council - Has supplied landfill data		0	11	372774 373849
	Local Authority Landfill Coverage Name: Cheshire County Council - Has supplied landfill data		0	10	372774 373849
	Local Authority Landfill Coverage Name: Macclesfield Borough Council - Has not been able to supply Landfill data		384	12	372430 374259

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	Control of Major Accident Hazards Sites (COMAH) Name: Oil And Pipelines Agency Location: Plumley Junction Psd, Back Lane, Plumley, Knutsford, Cheshire Reference: Not Supplied Type: Upper Tier Status: Active Positional Accuracy: Manually positioned within the geographical locality	A13NW (NW)	118	3	372606 374060
34	Control of Major Accident Hazards Sites (COMAH) Name: Oil And Pipelines Agency Location: Back Lane, Knutsford, Cheshire, WA16 9SJ Reference: Not Supplied Type: Lower Tier Status: Active Positional Accuracy: Manually positioned within the geographical locality	A13NW (NW)	246	3	372467 374090
35	Control of Major Accident Hazards Sites (COMAH) Name: Oil And Pipelines Agency Location: Cheshire, Back Lane, Nether Peover, Knutsford, Cheshire, Wa16 9sj Reference: Not Supplied Type: Upper Tier Status: Active Positional Accuracy: Manually positioned to the address or location	A12NE (W)	299	3	372329 373922
36	Planning Hazardous Substance Consents Name: Ministry Of Defence Location: Plumley Psd, Back Lane, Plumley, Wa16 9sj Authority: Cheshire West and Chester Council, Planning Department Application Ref: 06-2366-HAZ Hazardous Substance: Combination of Dangerous Substances Maximum Quantity: 3000000 Application date: 15th December 2006 Decision: Deemed Consent Granted Positional Accuracy: Manually positioned within the geographical locality	A13NW (NW)	0	4	372684 373961

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Triassic mudstones (including Keuper Marl, Dolomitic Conglomerate and Rhaetic)	A13NW (N)	0	2	372774 373849
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13NW (N)	0	5	372774 373849
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13NW (N)	32	5	372774 374000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13NE (E)	74	5	373000 373849
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13NE (NE)	177	5	373000 374000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13SE (SE)	198	5	373032 373628
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NE (S)	314	5	372898 373415

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12SE (SW)	336	5	372386 373599
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NE (SE)	351	5	373003 373406
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NW (S)	370	5	372682 373403
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NW (SW)	437	5	372482 373439
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel <15 mg/kg Concentration:	A18SW (NW)	471	5	372505 374405
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NW (S)	488	5	372573 373329

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12NE (W)	511	5	372131 374000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel <15 mg/kg Concentration:	A14NW (E)	516	5	373401 374042
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SE (S)	579	5	372956 373156
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel <15 mg/kg Concentration:	A17SE (NW)	580	5	372380 374464
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SE (S)	586	5	373000 373157
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NW (S)	600	5	372618 373178

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12NW (W)	622	5	372000 373849
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18NE (N)	635	5	373000 374529
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12NW (W)	637	5	372000 374000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18SE (N)	643	5	373042 374504
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	666	5	372660 373092
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A12NW (W)	666	5	372000 374100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SE (S)	669	5	372860 373058
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18NE (N)	687	5	373058 374547
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18NE (N)	687	5	373000 374576
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	707	5	372726 373033
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	715	5	372690 373032
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SE (S)	716	5	373000 373024

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	727	5	372774 373000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	727	5	372697 373018
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A9SW (SE)	728	5	373234 373102
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel <15 mg/kg Concentration:	A14NE (E)	735	5	373644 374000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A14NE (E)	735	5	373644 373997
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SE (S)	740	5	373000 373000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	743	5	372707 373000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18NW (N)	745	5	372774 374712
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	748	5	372681 373000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SE (S)	750	5	372910 372978
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	754	5	372737 372983
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	760	5	372717 372981

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18NW (N)	773	5	372482 374715
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel <15 mg/kg Concentration:	A9SW (SE)	774	5	373129 373000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SE (S)	782	5	373036 372964
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A14NE (E)	796	5	373705 374000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18NE (N)	808	5	373000 374710
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A9SW (SE)	819	5	373239 373000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A17SW (NW)	837	5	371886 374260
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A9SW (SE)	846	5	373294 373000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A9SW (SE)	861	5	373323 373000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A17NE (NW)	902	5	372179 374718
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel <15 mg/kg Concentration:	A19SE (NE)	910	5	373634 374413
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A7SW (SW)	936	5	372000 373163

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel <15 mg/kg Concentration:	A3NE (S)	936	5	373000 372801
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A19SE (NE)	986	5	373683 374471
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Brine Compensation Area Description: In an area which may be affected by subsidence due to salt extraction. It is recommended that the Cheshire Brine Subsidence Compensation Board is contacted for further information. Contact details are included in the Useful Contacts section. Source: Cheshire Brine Subsidence Compensation Board	A13NW (N)	0	6	372774 373849
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Mining Instability Mining Evidence: Inconclusive Evaporites Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13NW (N)	0	-	372774 373849
	Non Coal Mining Areas of Great Britain Risk: Unlikely Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849
	Potential for Ground Dissolution Stability Hazards Hazard Potential: High Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	197	2	373032 373629
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	2	372774 373849

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<p>Radon Potential - Radon Affected Areas</p> <p>Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level</p> <p>Source: British Geological Survey, National Geoscience Information Service</p>	A13NW (N)	0	2	372774 373849

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
37	Fuel Station Entries Name: Wayside Garage Location: B5081, Lower Peover, KNUTSFORD, Cheshire, WA16 Brand: Unbranded Premises Type: Petrol Station Status: Closed Positional Accuracy: Automatically positioned to the address	A14SE (E)	820	-	373741 373751

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
38	Areas of Adopted Green Belt Authority: Macclesfield Borough Council (now part of Cheshire East Council) Plan Name: Macclesfield Borough Local Plan Status: Adopted Plan Date: 8th January 2004	A17SE (NW)	381	7	372429 374255
39	Nitrate Vulnerable Zones Name: Not Supplied Description: NVZ Area Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A13NW (N)	0	8	372774 373849

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Macclesfield Borough Council (now part of Cheshire East Council) - Health and Public Safety	July 2008	Not Applicable
Congleton Borough Council (now part of Cheshire East Council) - Environmental Health Department	May 2009	Not Applicable
Vale Royal Borough Council (now part of Cheshire West and Chester Council) - Community Services Directorate	November 2008	Not Applicable
Cheshire East Council - Environmental Health Department	November 2012	Annually
Cheshire West and Chester Council - Environmental Health Department	November 2013	Annually
Discharge Consents		
Environment Agency - North West Region	February 2014	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - North West Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - North West Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - North West Region	February 2014	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Macclesfield Borough Council (now part of Cheshire East Council) - Environmental Health Department	February 2009	Not Applicable
Congleton Borough Council (now part of Cheshire East Council) - Environmental Health Department	January 2009	Not Applicable
Cheshire East Council - Environmental Health Department	January 2013	Annually
Vale Royal Borough Council (now part of Cheshire West and Chester Council) - Environmental Health Department	June 2009	Not Applicable
Cheshire West and Chester Council - Environmental Health Department	October 2013	Annually
Local Authority Pollution Prevention and Controls		
Macclesfield Borough Council (now part of Cheshire East Council) - Environmental Health Department	February 2009	Not Applicable
Congleton Borough Council (now part of Cheshire East Council) - Environmental Health Department	January 2009	Not Applicable
Cheshire East Council - Environmental Health Department	January 2013	Annually
Vale Royal Borough Council (now part of Cheshire West and Chester Council) - Environmental Health Department	June 2009	Not Applicable
Cheshire West and Chester Council - Environmental Health Department	October 2013	Annually
Local Authority Pollution Prevention and Control Enforcements		
Macclesfield Borough Council (now part of Cheshire East Council) - Environmental Health Department	February 2009	Not Applicable
Congleton Borough Council (now part of Cheshire East Council) - Environmental Health Department	January 2009	Not Applicable
Cheshire East Council - Environmental Health Department	January 2013	Annually
Vale Royal Borough Council (now part of Cheshire West and Chester Council) - Environmental Health Department	June 2009	Not Applicable
Cheshire West and Chester Council - Environmental Health Department	October 2013	Annually
Nearest Surface Water Feature		
Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters		
Environment Agency - North West Region	January 2000	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - North West Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - North West Region	March 2013	As notified
Registered Radioactive Substances		
Environment Agency - North West Region	February 2014	Quarterly
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable

Agency & Hydrological	Version	Update Cycle
River Quality Biology Sampling Points Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register Environment Agency - North West Region - South Area	February 2014	Quarterly
Water Abstractions Environment Agency - North West Region	December 2014	Quarterly
Water Industry Act Referrals Environment Agency - North West Region	February 2014	Quarterly
Groundwater Vulnerability Environment Agency - Head Office	January 2011	Not Applicable
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	October 2012	Annually
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	October 2012	Annually
Source Protection Zones Environment Agency - Head Office	December 2014	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	December 2013	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	December 2013	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	December 2013	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	December 2013	Quarterly
Flood Defences Environment Agency - Head Office	December 2013	Quarterly
Detailed River Network Lines Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage Environment Agency - Head Office	March 2012	Annually













Waste	Version	Update Cycle
BGS Recorded Landfill Sites British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites Environment Agency - North West Region - South Area Environment Agency - South East Region - Kent & South London Area Environment Agency - South East Region - North East Thames Area Environment Agency - South East Region - Solent & South Downs Area Environment Agency - South East Region - West Thames Area	October 2013 October 2013 October 2013 October 2013 October 2013	Quarterly Quarterly Quarterly Quarterly Quarterly
Integrated Pollution Control Registered Waste Sites Environment Agency - North West Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries) Environment Agency - North West Region - South Area Environment Agency - South East Region - Kent & South London Area Environment Agency - South East Region - North East Thames Area Environment Agency - South East Region - Solent & South Downs Area Environment Agency - South East Region - West Thames Area	February 2014 February 2014 February 2014 February 2014 February 2014	Quarterly Quarterly Quarterly Quarterly Quarterly
Licensed Waste Management Facilities (Locations) Environment Agency - North West Region - South Area	February 2014	Quarterly
Local Authority Landfill Coverage Cheshire County Council (now part of Cheshire East Council) - Environmental Planning Department Congleton Borough Council (now part of Cheshire East Council) - Environmental Health Department Macclesfield Borough Council (now part of Cheshire East Council) - Environmental Health Department Vale Royal Borough Council (now part of Cheshire West and Chester Council) - Environmental Health Department	May 2000 May 2000 May 2000 May 2000	Not Applicable Not Applicable Not Applicable Not Applicable
Local Authority Recorded Landfill Sites Congleton Borough Council (now part of Cheshire East Council) - Environmental Health Department Cheshire County Council (now part of Cheshire East Council) - Environmental Planning Department Macclesfield Borough Council (now part of Cheshire East Council) - Environmental Health Department Vale Royal Borough Council (now part of Cheshire West and Chester Council) - Environmental Health Department	August 2003 February 2005 May 2000 May 2000	Not Applicable Not Applicable Not Applicable Not Applicable
Registered Landfill Sites Environment Agency - North West Region - South Area	March 2003	Not Applicable
Registered Waste Transfer Sites Environment Agency - North West Region - South Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites Environment Agency - North West Region - South Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	August 2013	Bi-Annually
Explosive Sites Health and Safety Executive	November 2013	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements Vale Royal Borough Council (now part of Cheshire West and Chester Council) Macclesfield Borough Council (now part of Cheshire East Council) - Planning Department Cheshire County Council (now part of Cheshire East Council) - Planning Department Congleton Borough Council (now part of Cheshire East Council) Cheshire East Council - Planning Department Cheshire West and Chester Council - Planning Department	August 2009 December 2008 July 2008 July 2009 October 2013 October 2013	Not Applicable Not Applicable Annual Rolling Update Not Applicable Annually Annually
Planning Hazardous Substance Consents Vale Royal Borough Council (now part of Cheshire West and Chester Council) Macclesfield Borough Council (now part of Cheshire East Council) - Planning Department Cheshire County Council (now part of Cheshire East Council) - Planning Department Congleton Borough Council (now part of Cheshire East Council) Cheshire East Council - Planning Department Cheshire West and Chester Council - Planning Department	August 2009 December 2008 July 2008 July 2009 October 2013 October 2013	Not Applicable Not Applicable Annual Rolling Update Not Applicable Annually Annually

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	August 1996	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	January 2010	Variable
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	October 2013	Bi-Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Mining Report Service	December 2013	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	February 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	February 2014	Quarterly
Fuel Station Entries Catalist Ltd - Experian	August 2013	Quarterly

Sensitive Land Use	Version	Update Cycle
Areas of Adopted Green Belt Congleton Borough Council (now part of Cheshire East Council) Macclesfield Borough Council (now part of Cheshire East Council) Vale Royal Borough Council (now part of Cheshire West and Chester Council)	February 2014 February 2014 February 2014	As notified As notified As notified
Areas of Unadopted Green Belt Congleton Borough Council (now part of Cheshire East Council) Macclesfield Borough Council (now part of Cheshire East Council) Vale Royal Borough Council (now part of Cheshire West and Chester Council)	February 2014 February 2014 February 2014	As notified As notified As notified
Areas of Outstanding Natural Beauty Natural England	January 2014	Bi-Annually
Environmentally Sensitive Areas Natural England	July 2013	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	July 2013	Bi-Annually
Marine Nature Reserves Natural England	July 2013	Bi-Annually
National Nature Reserves Natural England	January 2014	Bi-Annually
National Parks Natural England	January 2014	Bi-Annually
Nitrate Sensitive Areas Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2012	Not Applicable
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2013	Annually
Ramsar Sites Natural England	July 2013	Bi-Annually
Sites of Special Scientific Interest Natural England	July 2013	Bi-Annually
Special Areas of Conservation Natural England	July 2013	Bi-Annually
Special Protection Areas Natural England	July 2013	Bi-Annually

A selection of organisations who provide data within this report

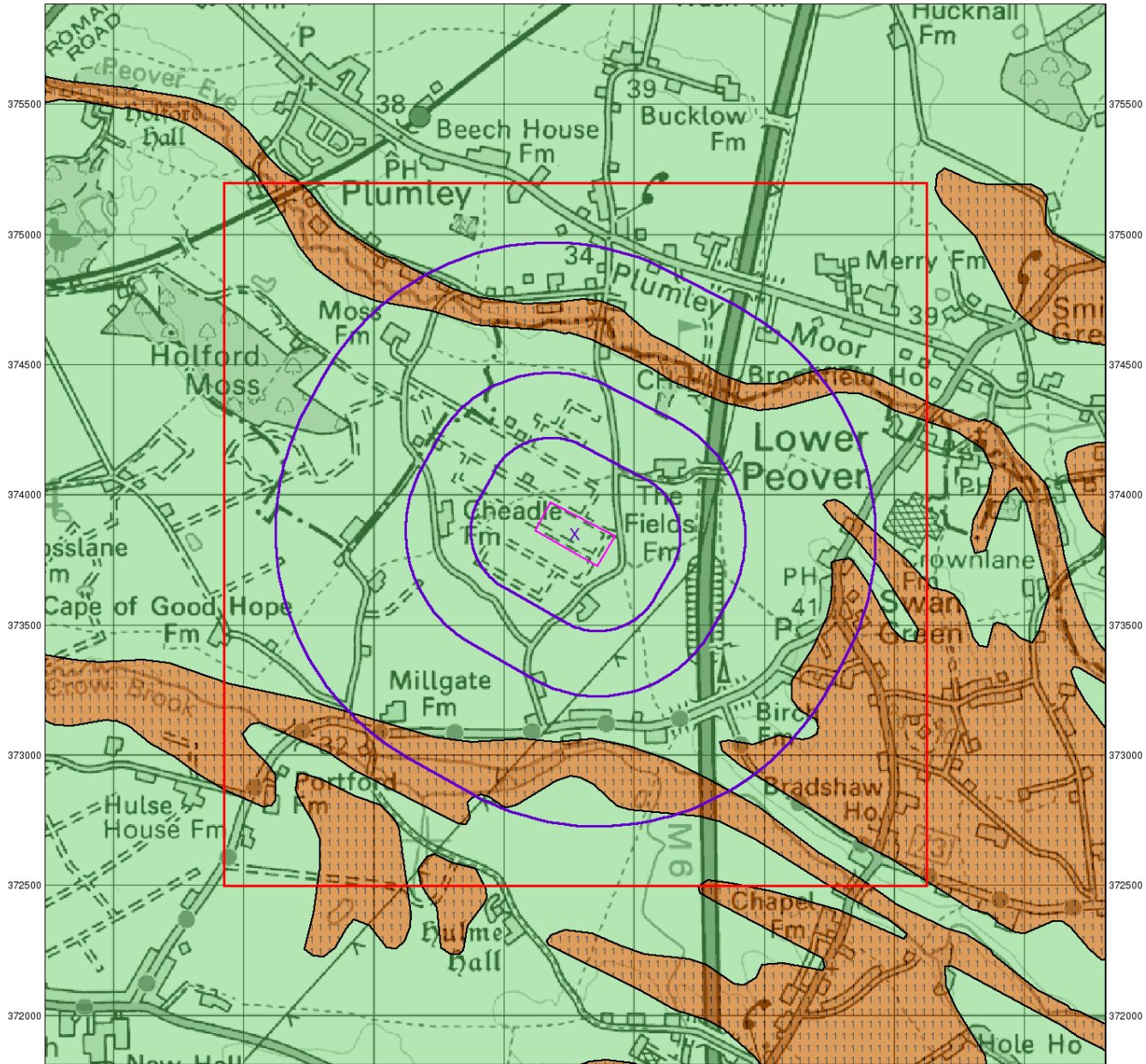
Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	 <p>British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL</p>
Centre for Ecology and Hydrology	 <p>Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL</p>
Countryside Council for Wales	 <p>CYNGOR CEFN GWLAD CYMRU COUNTRYSIDE COUNCIL FOR WALES</p>
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Contact	Name and Address	Contact Details
1	Environment Agency - National Customer Contact Centre (NCCC) PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
2	British Geological Survey - Enquiry Service British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
3	Health and Safety Executive 5S.2 Redgrave Court, Merton Road, Bootle, L20 7HS	Website: www.hse.gov.uk
4	Cheshire West and Chester Council - Planning Department County Hall, Cheshire, CH1 1SF	Telephone: 0300 1238 123 Email: enquiries@cheshirewestandchester.gov.uk Website: www.cheshirewestandchester.gov.uk
5	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmarkinfo.co.uk
6	Cheshire Brine Subsidence Compensation Board Sir Henry Doulton House, Forge Lane, Etruria, Stoke on Trent, Staffordshire, ST1 5BD	Telephone: 0845 002 0562 Fax: 0845 111 8888 Email: info@cheshirebrine.com Website: www.cheshirebrine.com
7	Macclesfield Borough Council (now part of Cheshire East Council) Town Hall, Macclesfield, Cheshire, SK10 1DP	Telephone: 01625 500500 Fax: 01625 504779 Website: www.macclesfield.gov.uk
8	Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA) Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
9	Natural England Northminster House, Northminster Road, Peterborough, Cambridgeshire, PE1 1UA	Telephone: 0845 600 3078 Fax: 01733 455103 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
10	Cheshire County Council (now part of Cheshire East Council) - Environmental Planning Department Backford Hall, Backford, Chester, Cheshire, CH1 6EA	Telephone: 01244 602424 Website: www.cheshire.gov.uk
11	Vale Royal Borough Council (now part of Cheshire West and Chester Council) - Environmental Health Department Wyvern House, The Drummer, Winsford, Cheshire, CW7 1AH	Telephone: 01606 862862 Fax: 01606 867885 Website: www.valeroyal.gov.uk
12	Macclesfield Borough Council (now part of Cheshire East Council) - Environmental Health Department Town Hall, Macclesfield, Cheshire, SK10 1DU	Telephone: 01625 500500 Fax: 01625 504779 Website: www.macclesfield.gov.uk
-	Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Contact	Name and Address	Contact Details
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Please note that the Environment Agency / SEPA have a charging policy in place for enquiries.

371000 371500 372000 372500 373000 373500 374000 374500



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Groundwater Vulnerability

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

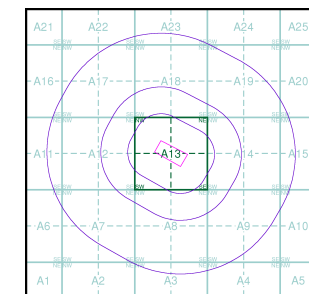
Agency and Hydrological

Geological Classes

- | | | |
|---|--|-----------------------|
| Major Aquifer
(Highly Permeable) | | High (H) 1, 2, 3, U |
| | | Intermediate (I) 1, 2 |
| | | Low |
| Minor Aquifer
(Variably Permeable) | | High (H) 1, 2, 3, U |
| | | Intermediate (I) 1, 2 |
| | | Low |
| Non Aquifer
(Negligibly Permeable) | | |
| Water or Sea | | |
| Drift Deposit | | |

Soil Classes

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 53976325_1.1
 Customer Ref: Project Linds
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

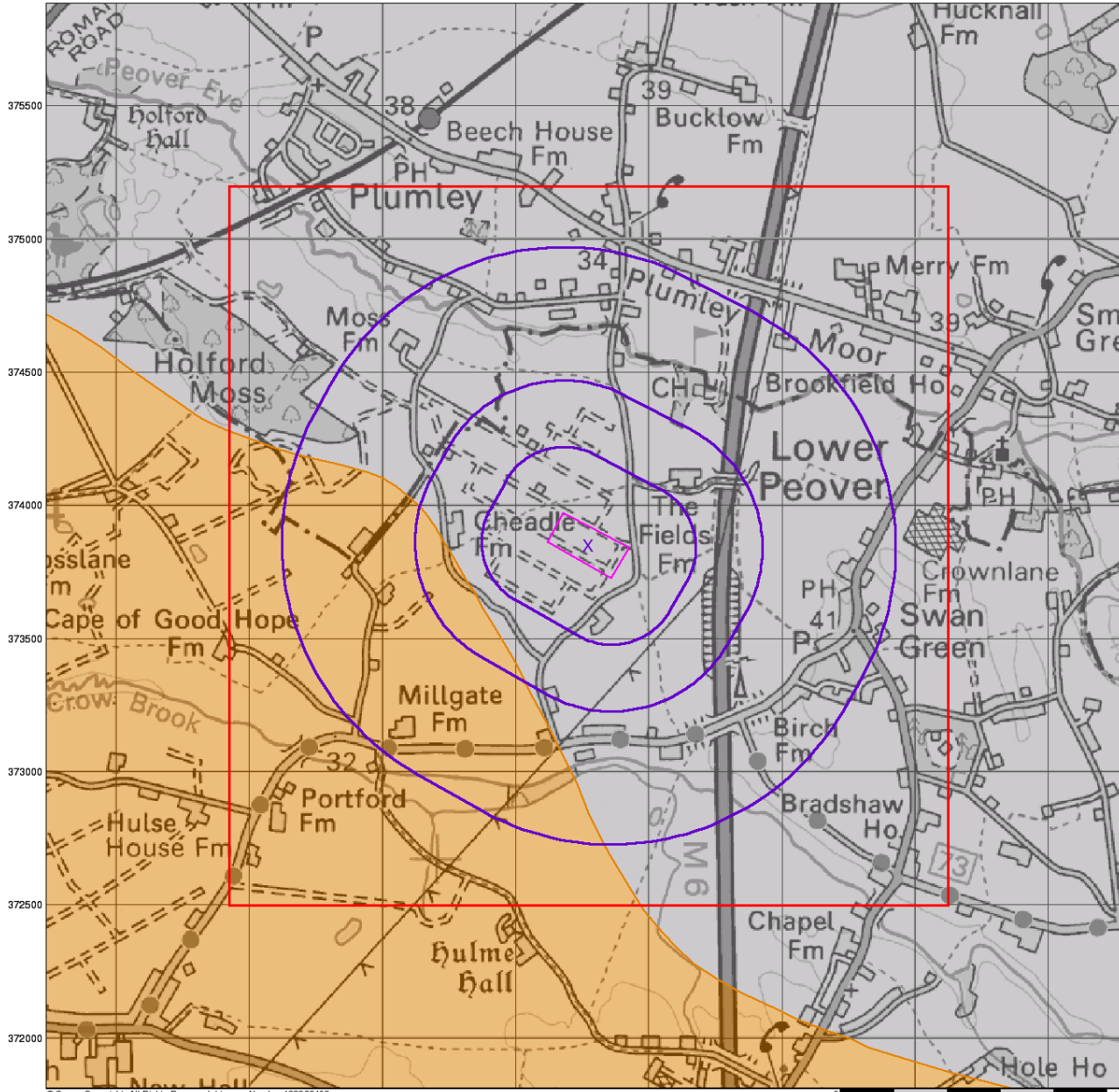
Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



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 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

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0 1 km



Bedrock Aquifer Designation

General

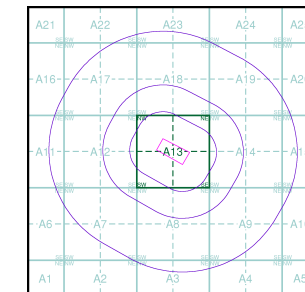
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- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

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 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

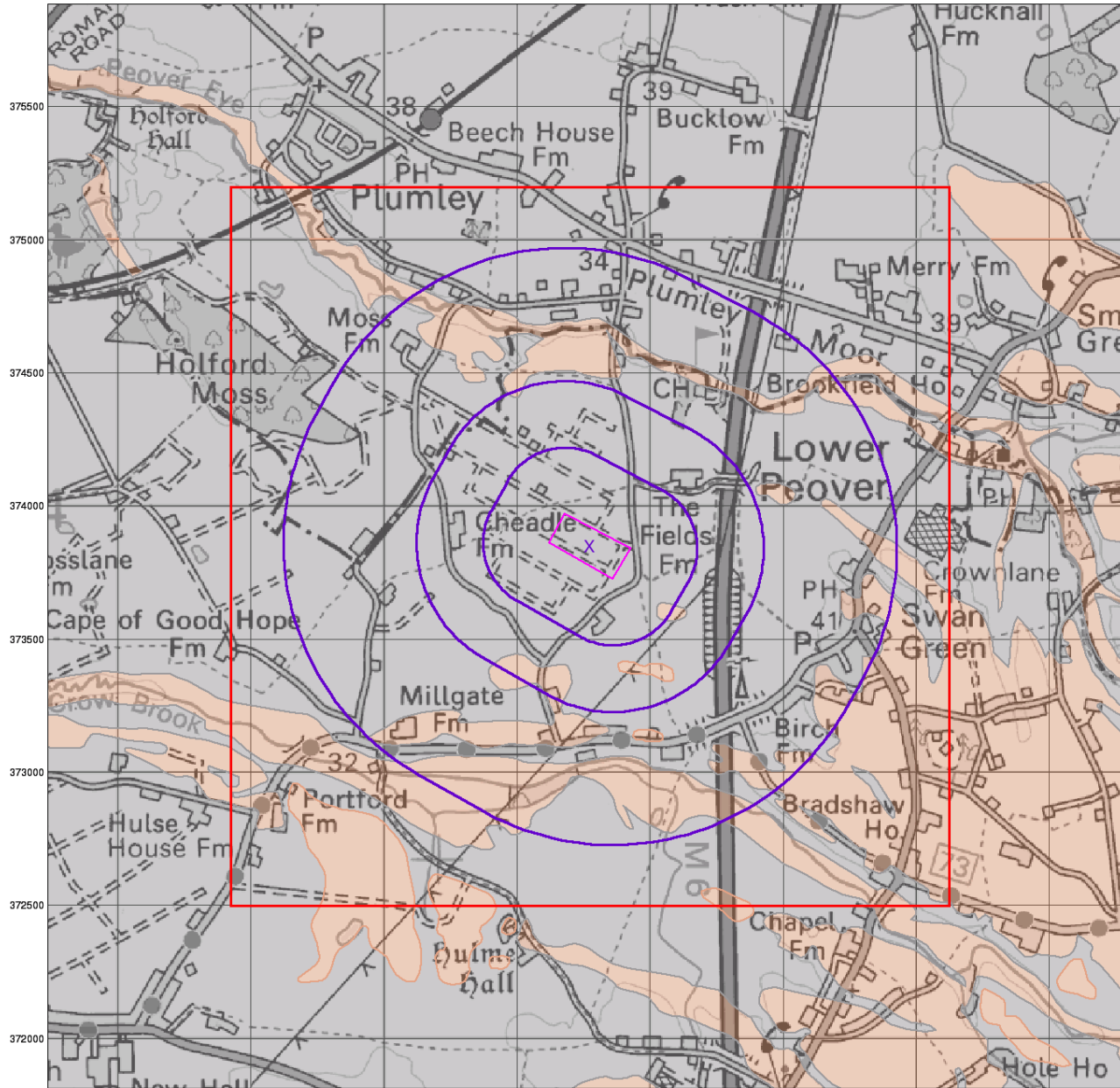
Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



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 Fax: 0844 844 9951
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0 1 km



Superficial Aquifer Designation

General

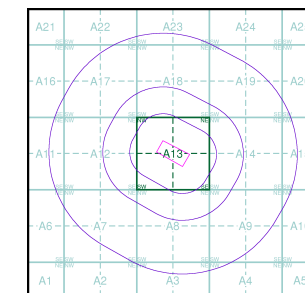
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- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

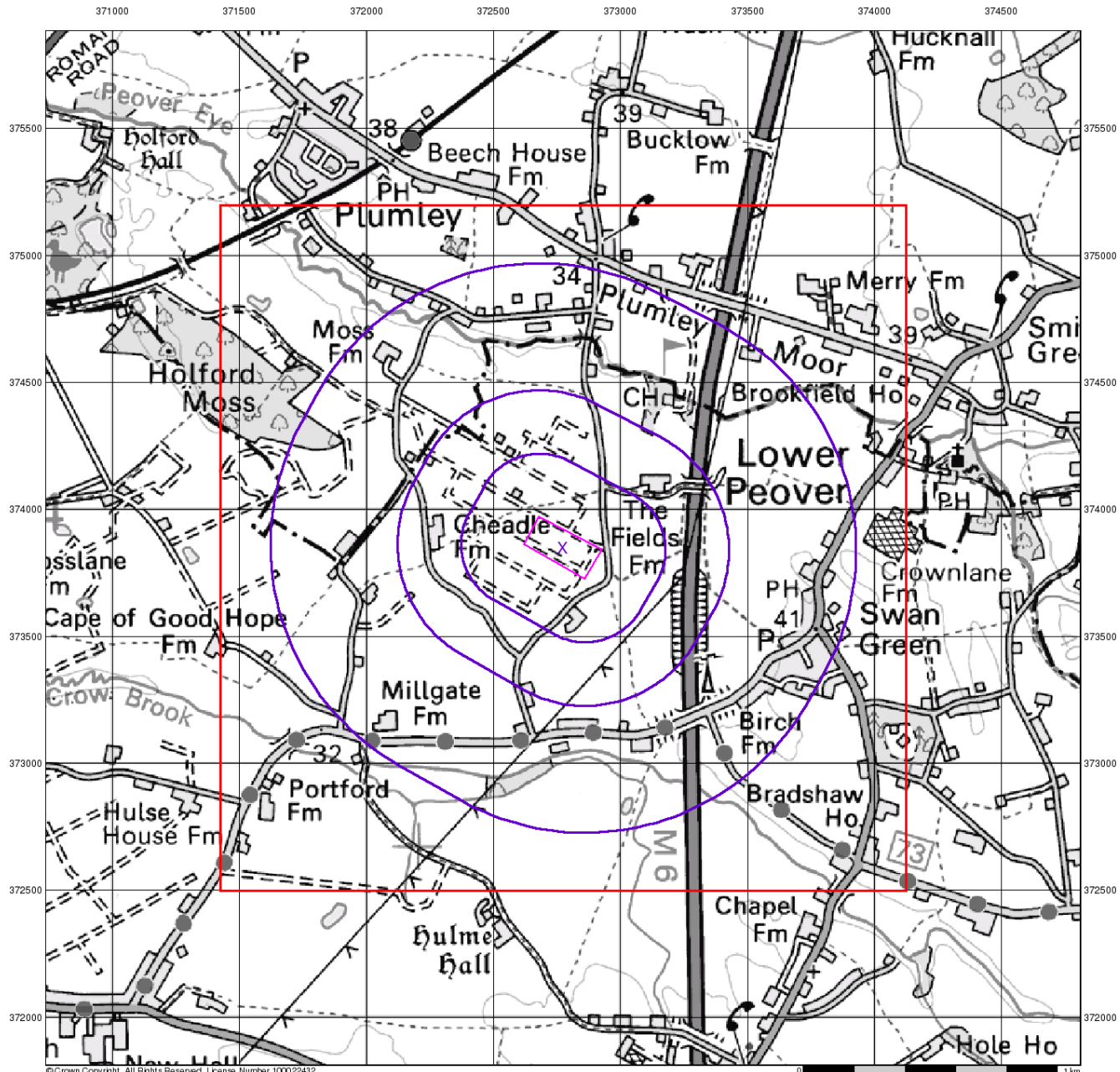
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 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



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Source Protection Zones

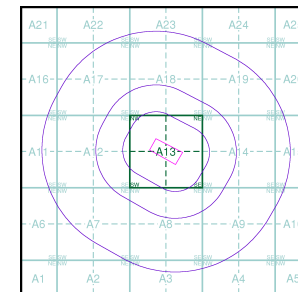
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

- Source Protection Zone I
- Source Protection Zone II
- Source Protection Zone III
- Zone of Special Interest
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

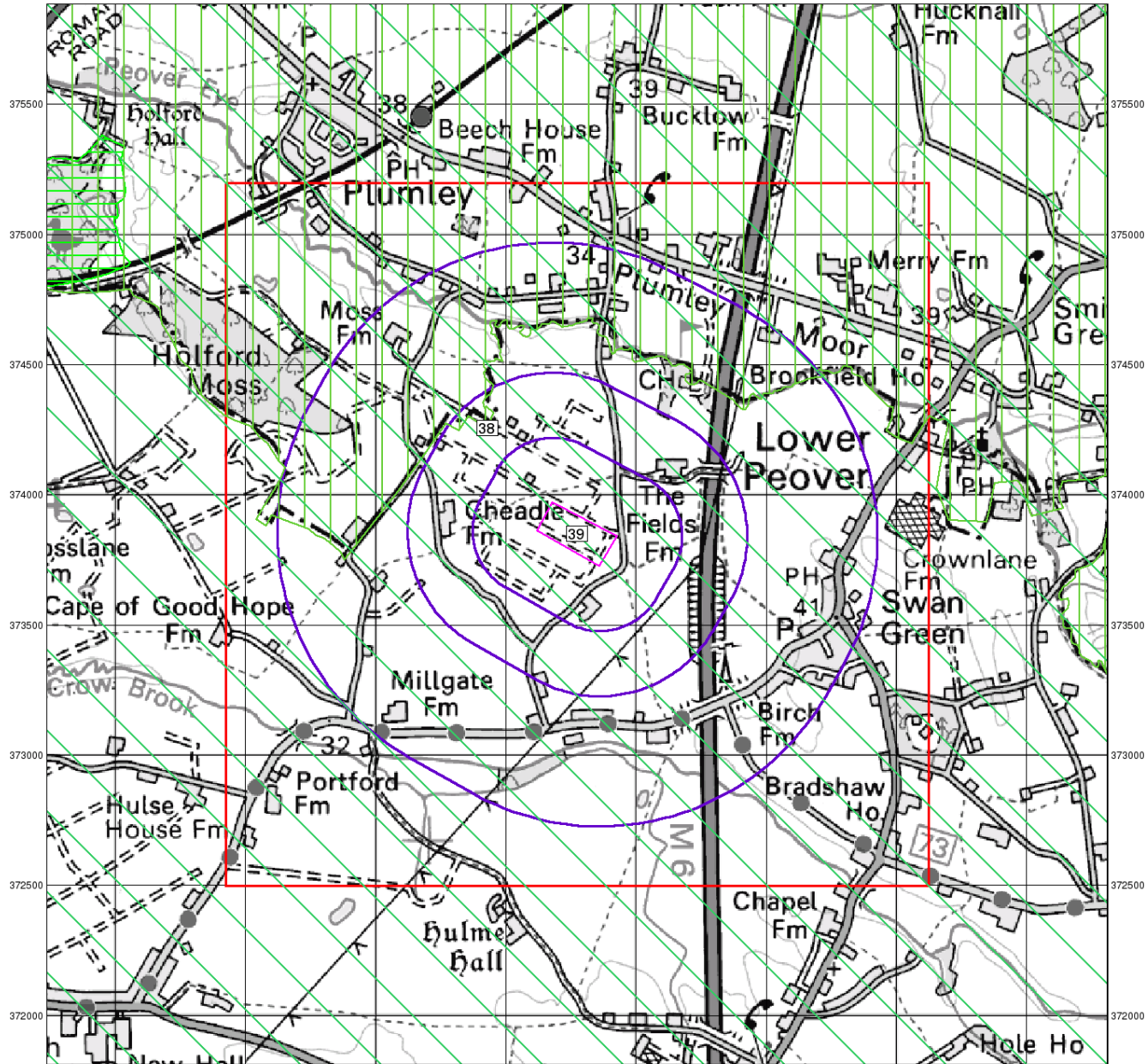
Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



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 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

371000 371500 372000 372500 373000 373500 374000 374500



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Sensitive Land Uses

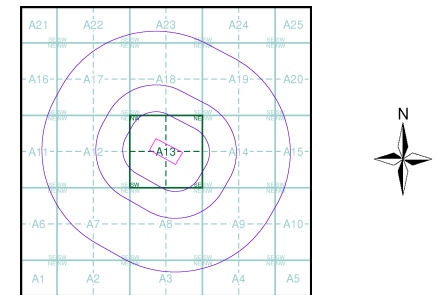
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
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Site Details

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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	-285 Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Coppice		Heath
	Rough Grassland		Marsh
	Reeds		Saltings
	Building		Glasshouse
	Sloping Masonry		Pylon
	Electricity Transmission Line		Pole
	Cutting		Embankment
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		
	Administrative County, County Borough or County of City		
	Municipal Borough, Urban or Rural District, Burgh or District Council		
	Borough, Burgh or County Constituency Shown only when not coincident with other boundaries		
	Civil Parish Shown alternately when coincidence of boundaries occurs		
	BP, BS Boundary Post or Stone		Pol Sta Police Station
	Ch Church		PO Post Office
	CH Club House		PC Public Convenience
	F E Sta Fire Engine Station		PH Public House
	FB Foot Bridge		SB Signal Box
	Fn Fountain		Spr Spring
	GP Guide Post		TCB Telephone Call Box
	MP Mile Post		TCP Telephone Call Post
	MS Mile Stone		W Well

1:10,000 Raster Mapping

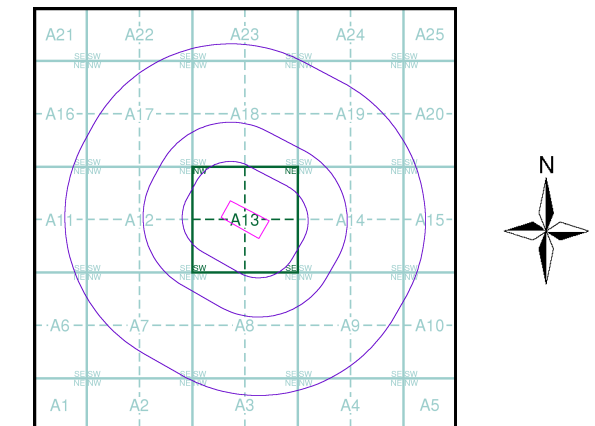
	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	MHW(S) Mean high water (springs)		MLW(S) Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Cheshire	1:10,560	1882	2
Cheshire	1:10,560	1882	3
Cheshire	1:10,560	1899	4
Cheshire	1:10,560	1910 - 1911	5
Cheshire	1:10,560	1911	6
Cheshire	1:10,560	1911	7
Cheshire	1:10,560	1938	8
Ordnance Survey Plan	1:10,000	1954	9
Ordnance Survey Plan	1:10,000	1964	10
Ordnance Survey Plan	1:10,000	1975 - 1976	11
10K Raster Mapping	1:10,000	2006	12
VectorMap Local	1:10,000	2013	13

Historical Map - Slice A



Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

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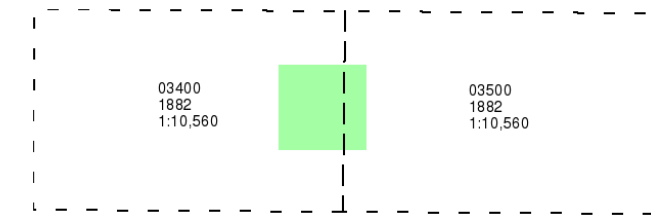
Cheshire

Published 1882

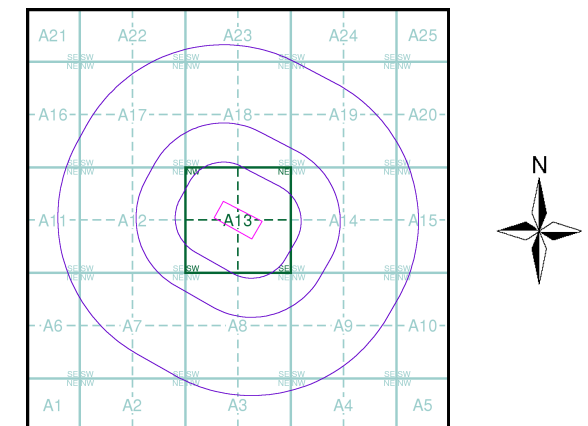
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A

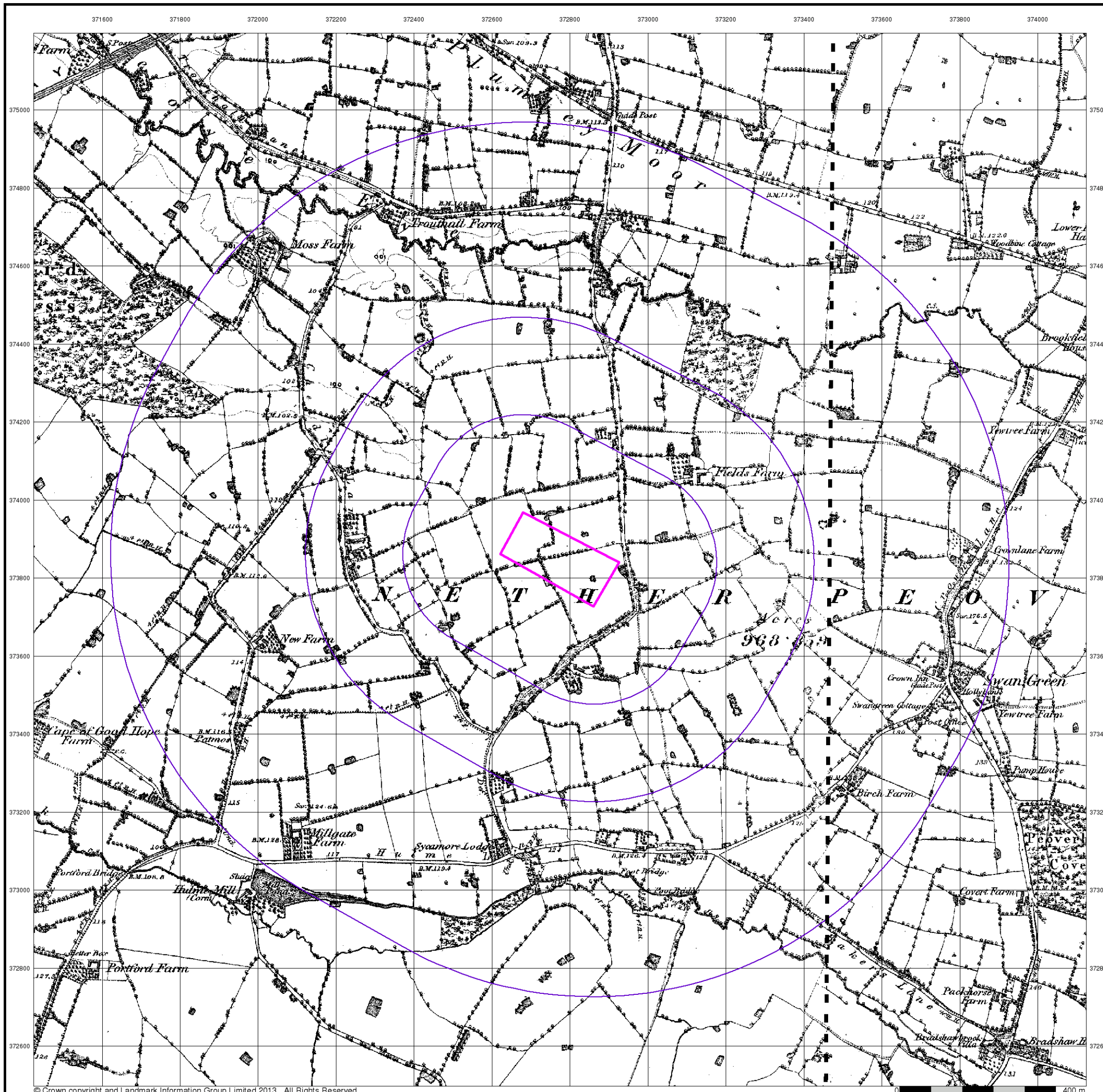


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



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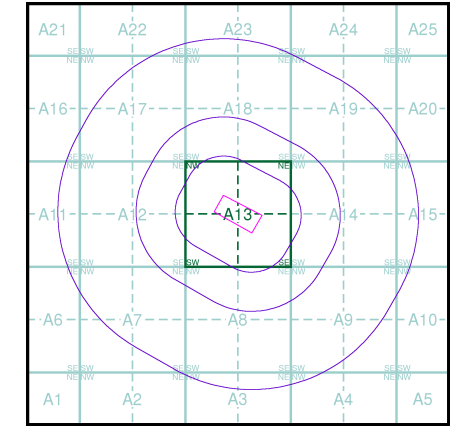
Cheshire
Published 1882
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

	03500 1882 1:10,560
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Historical Map - Slice A



Order Details

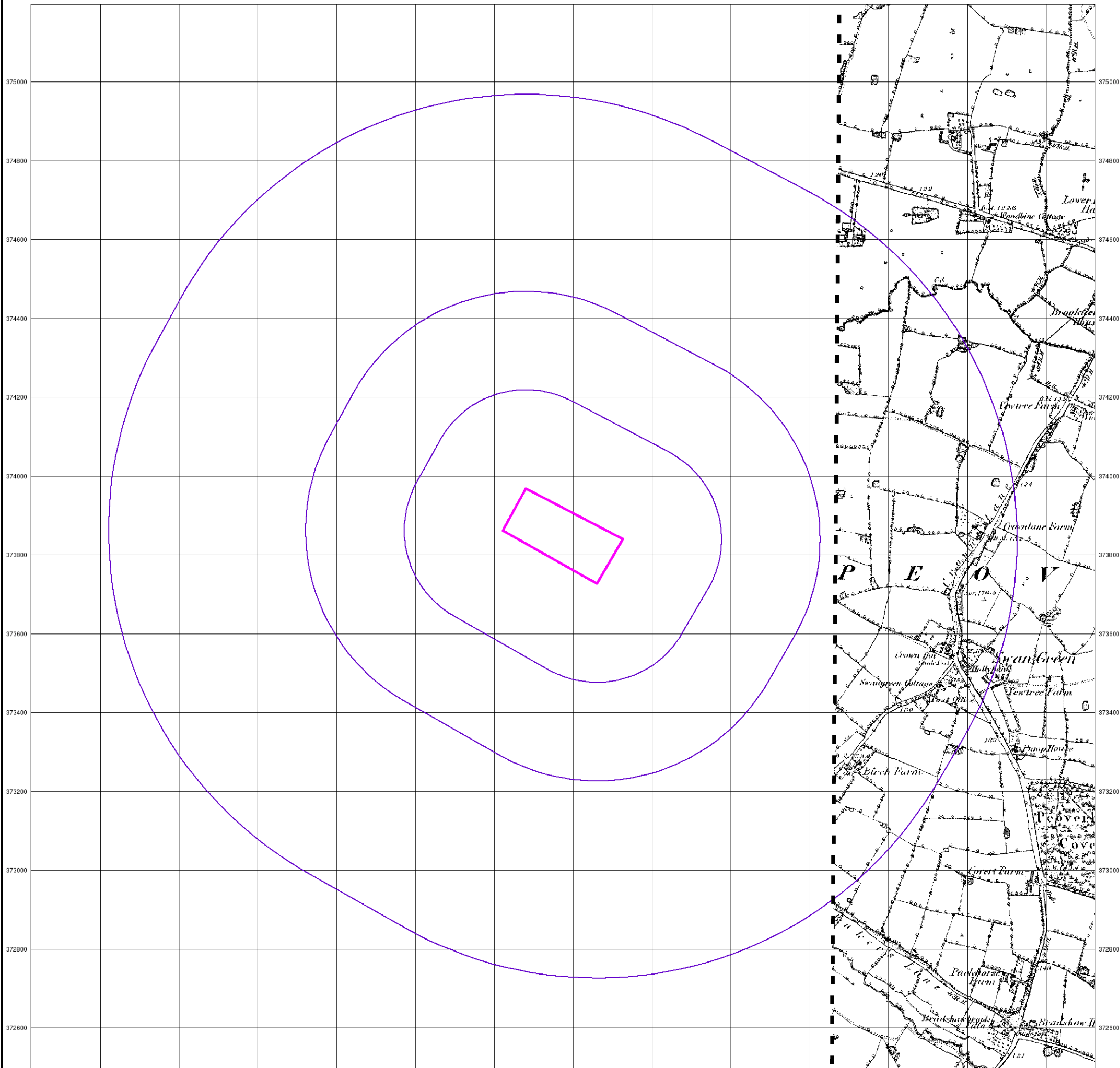
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 Customer Ref: Project Lindis
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 Slice: A
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Site Details

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Cheshire

Published 1899

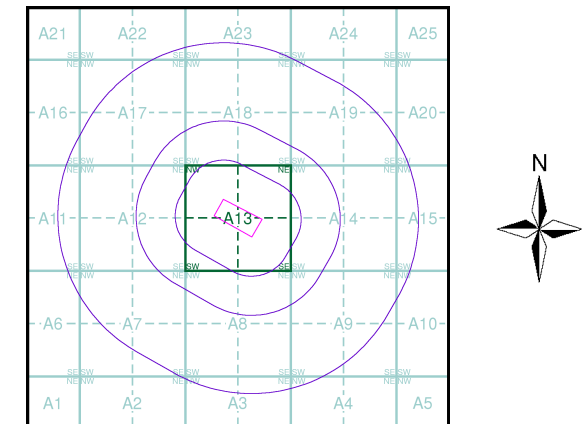
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

034NE 1899 1:10,560	035NW 1899 1:10,560
034SE 1899 1:10,560	035SW 1899 1:10,560

Historical Map - Slice A

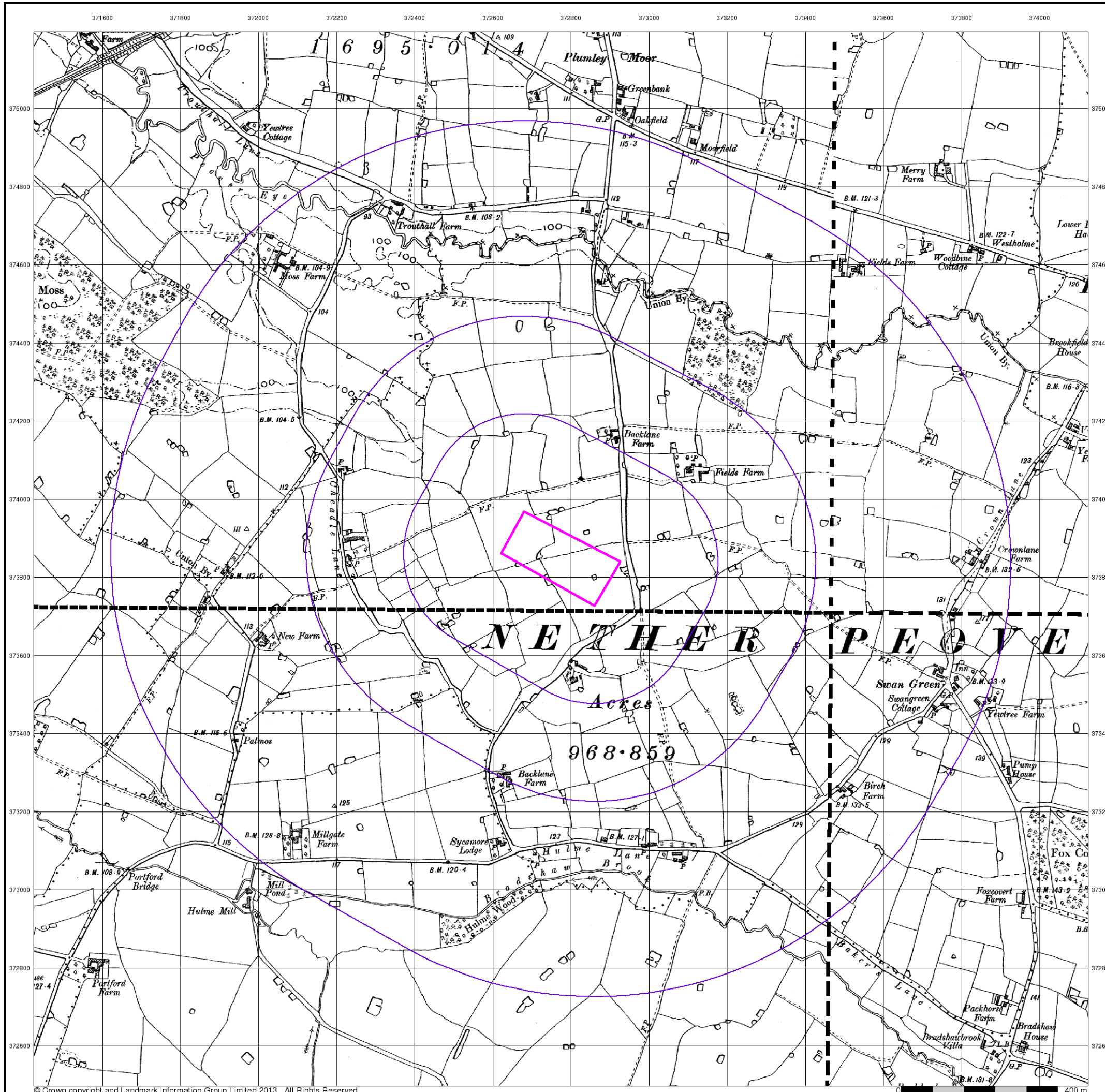


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Cheshire

Published 1910 - 1911

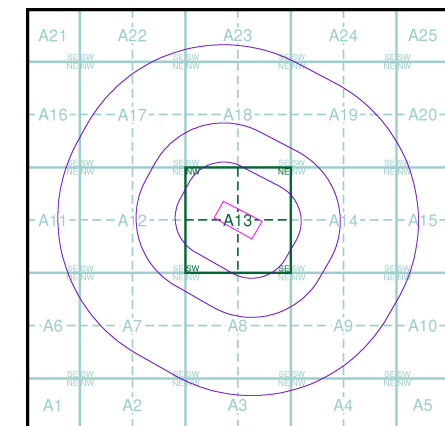
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

034NE 1911 1:10,560	035NW 1911 1:10,560
034SE 1911 1:10,560	035SW 1910 1:10,560

Historical Map - Slice A

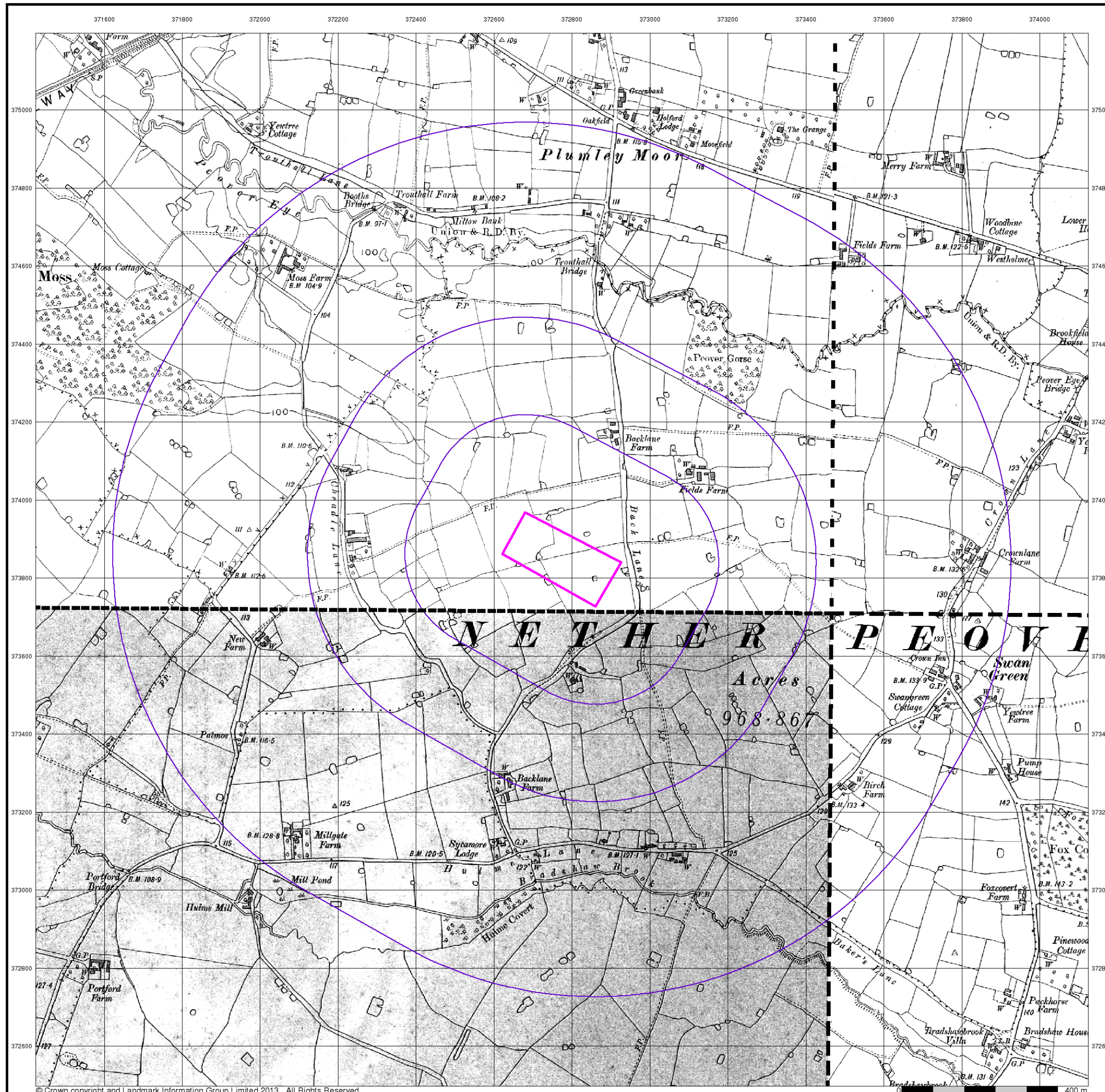


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



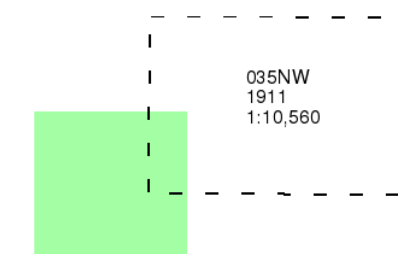
Cheshire

Published 1911

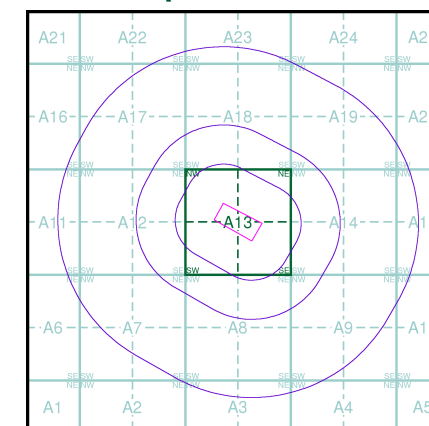
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A

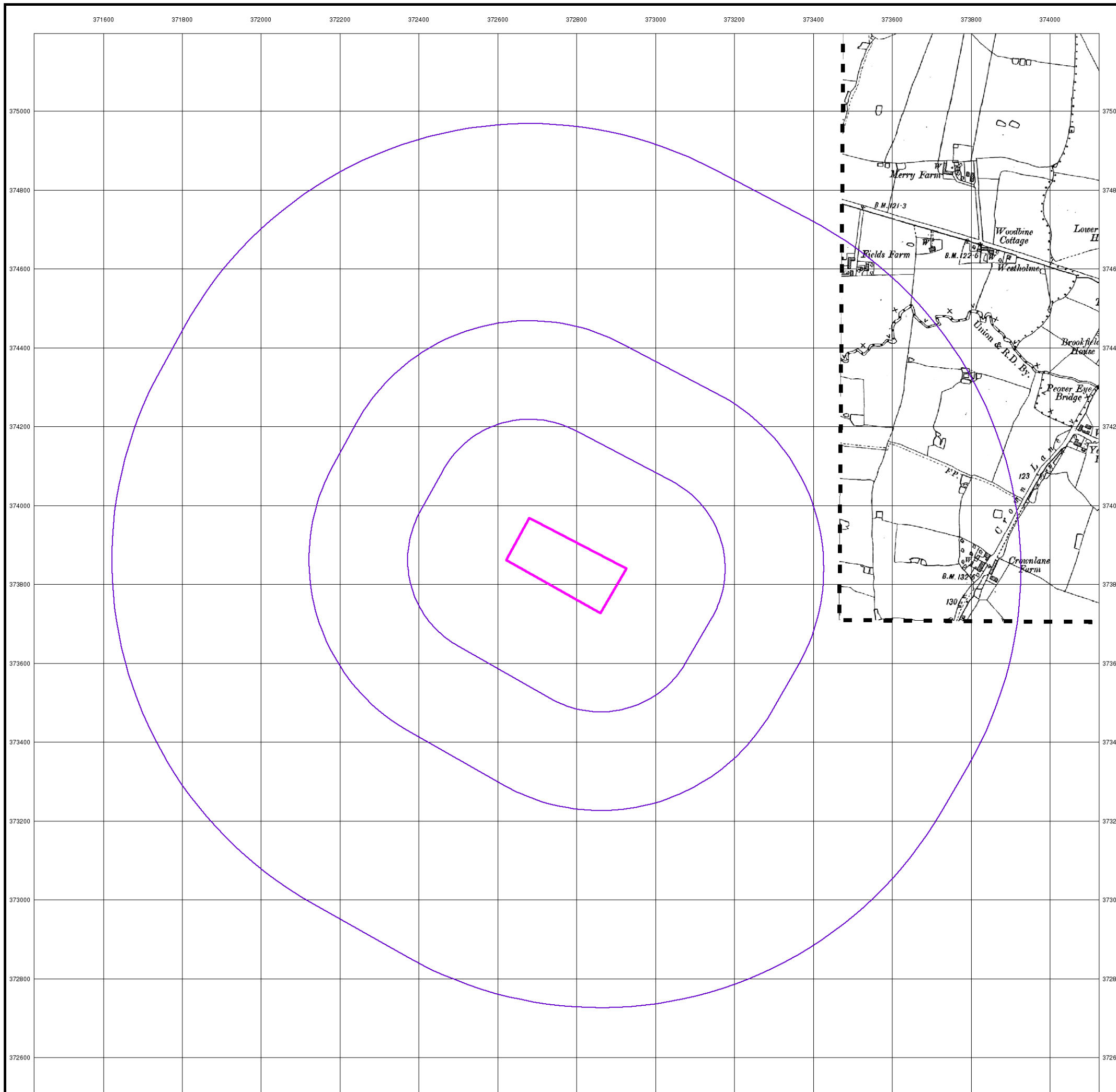


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
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 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane,
 Plumley, KNUTSFORD, Cheshire, WA16 9SJ



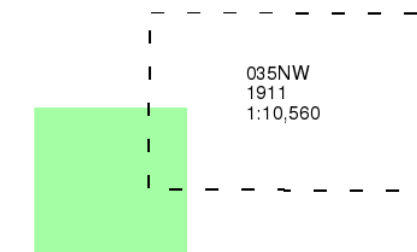
Cheshire

Published 1911

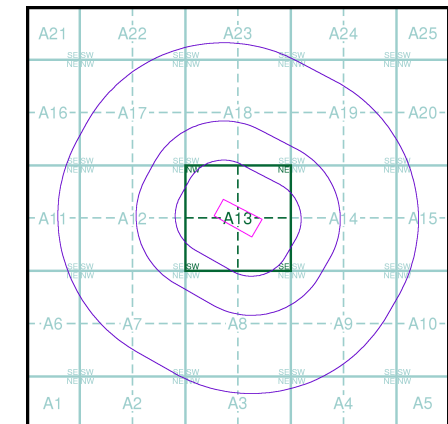
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Map Name(s) and Date(s)



Historical Map - Slice A

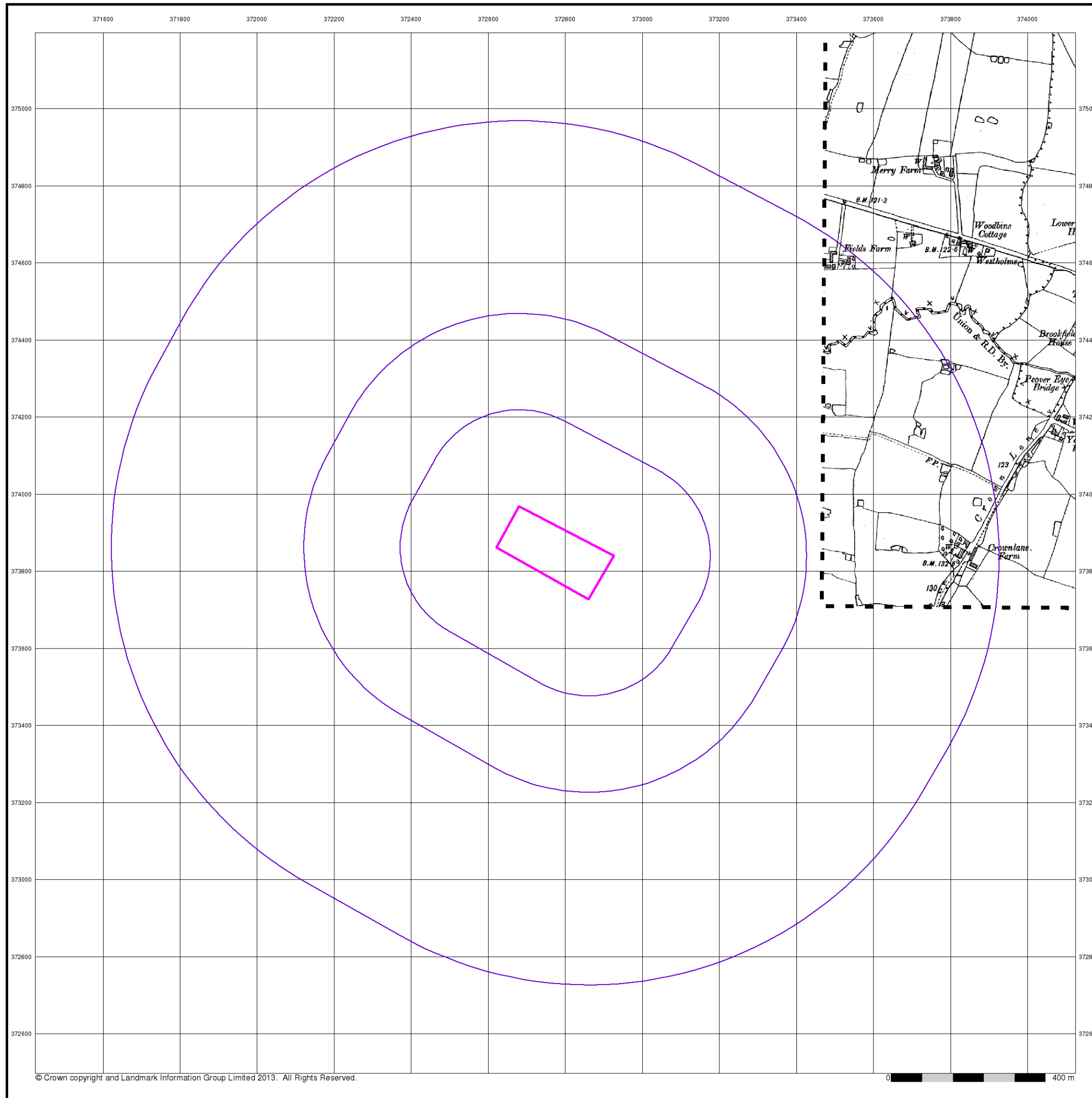


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Site Details

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 Plumley, KNUTSFORD, Cheshire, WA16 9SJ



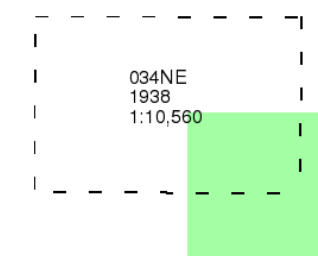
Cheshire

Published 1938

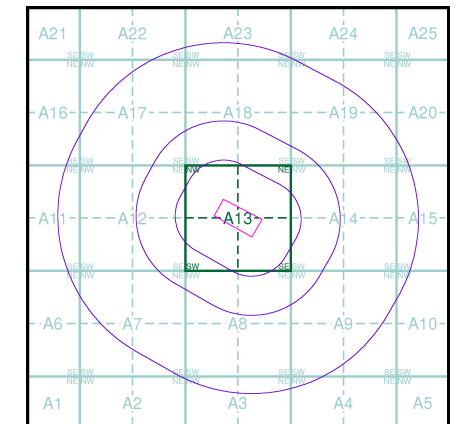
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Map Name(s) and Date(s)



Historical Map - Slice A

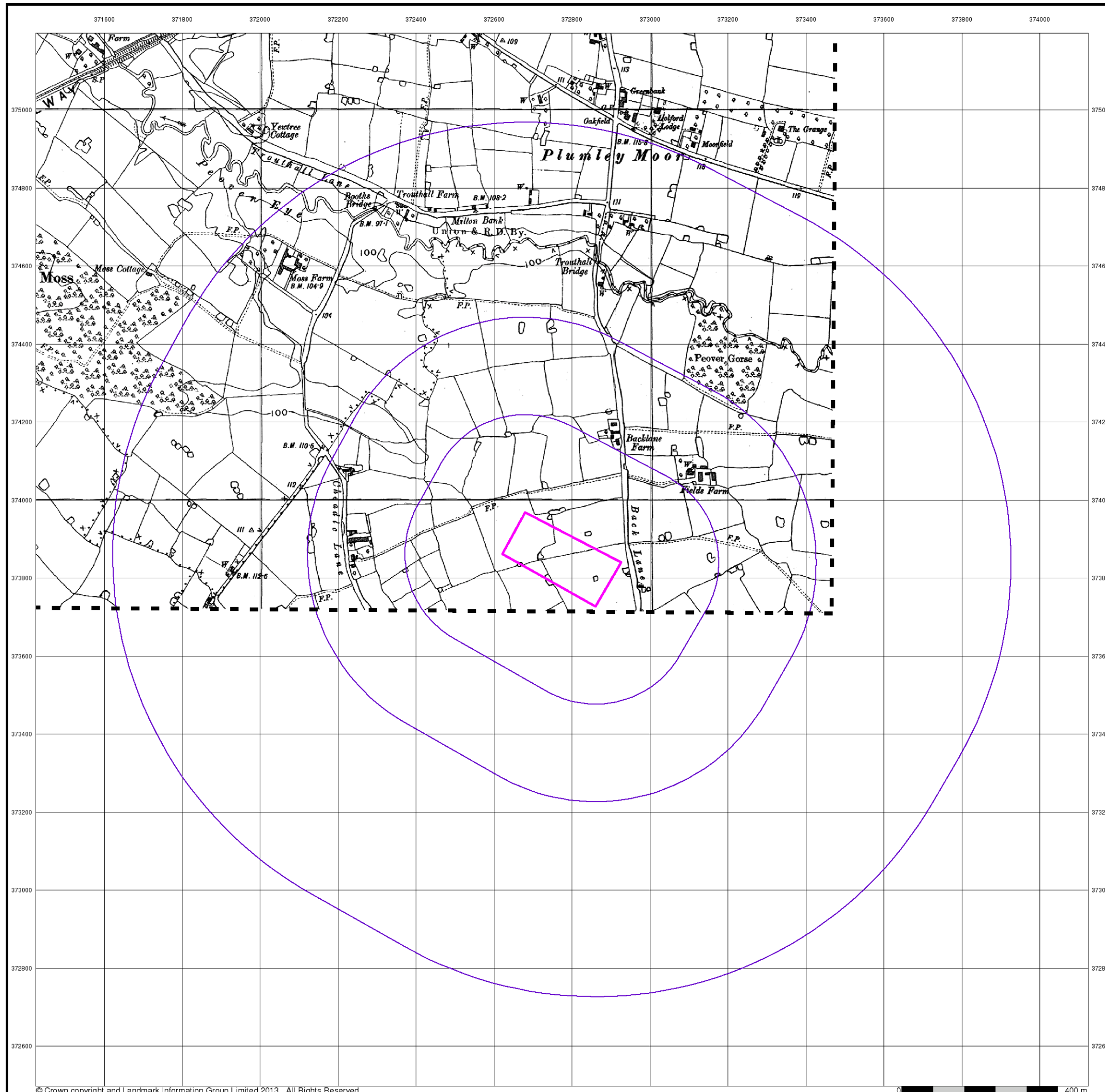


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
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 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Ordnance Survey Plan

Published 1954

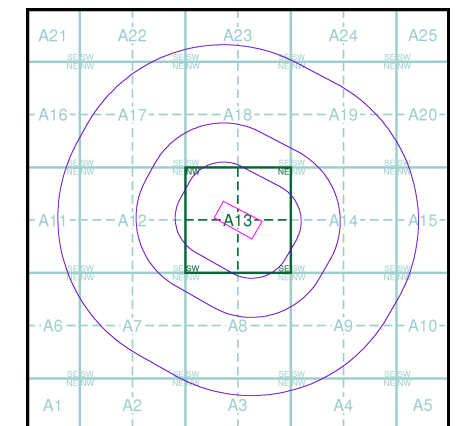
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SJ77NW	1954	1:10,560
SJ77SW	1954	1:10,560

Historical Map - Slice A

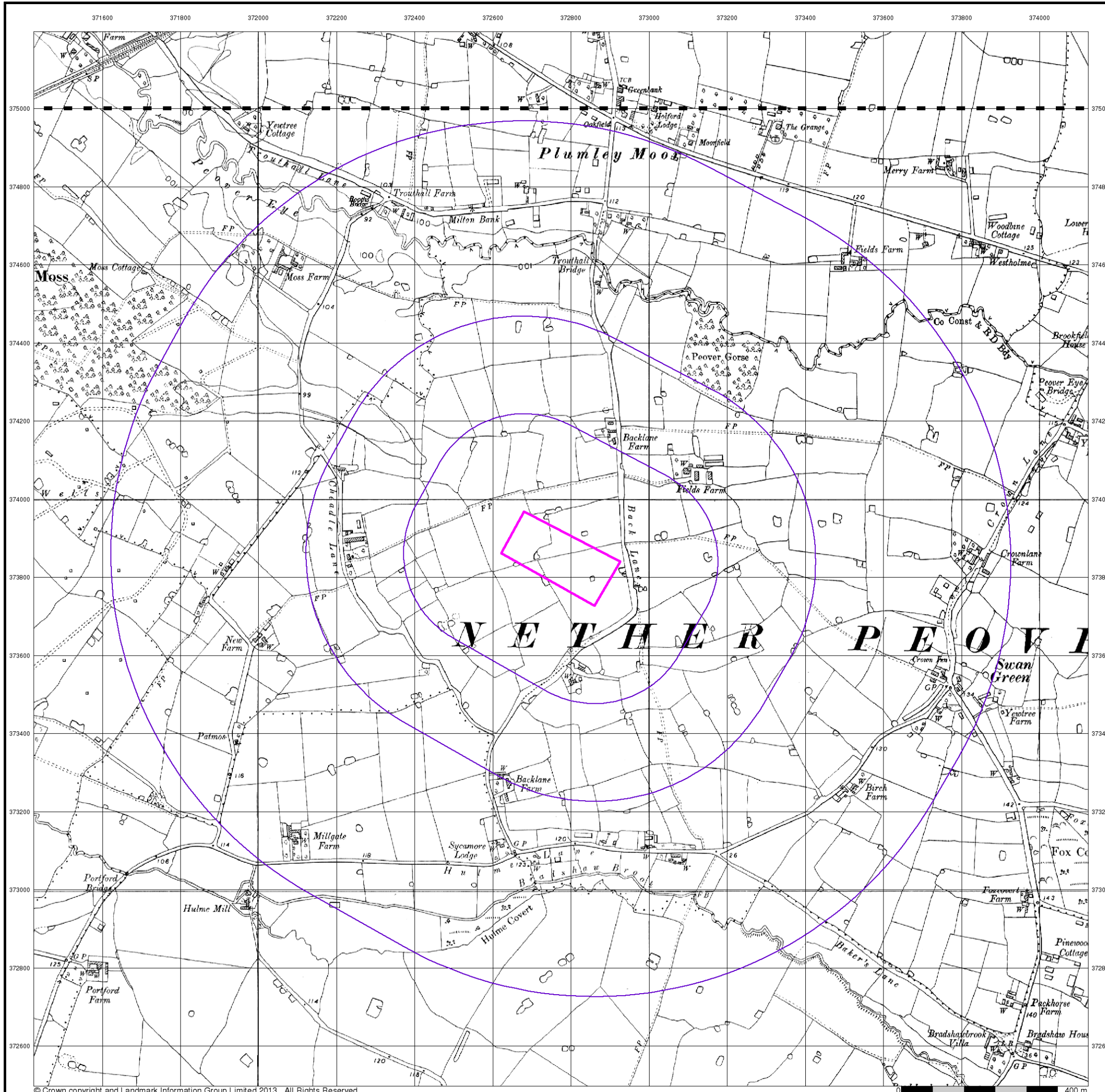


Order Details

Order Number: 53976325_1_1
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 Slice: A
 Site Area (Ha): 3.5
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Site Details

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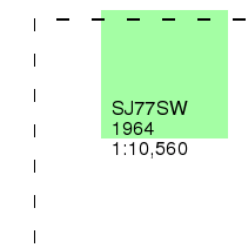
Ordnance Survey Plan

Published 1964

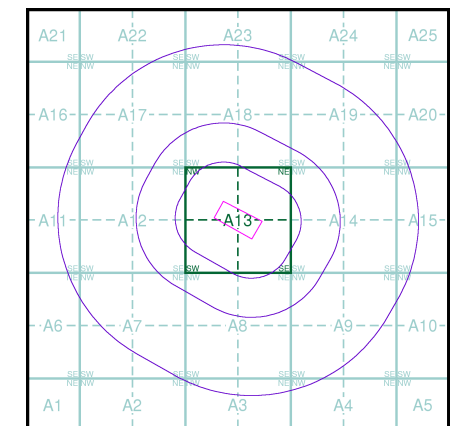
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Map Name(s) and Date(s)



Historical Map - Slice A

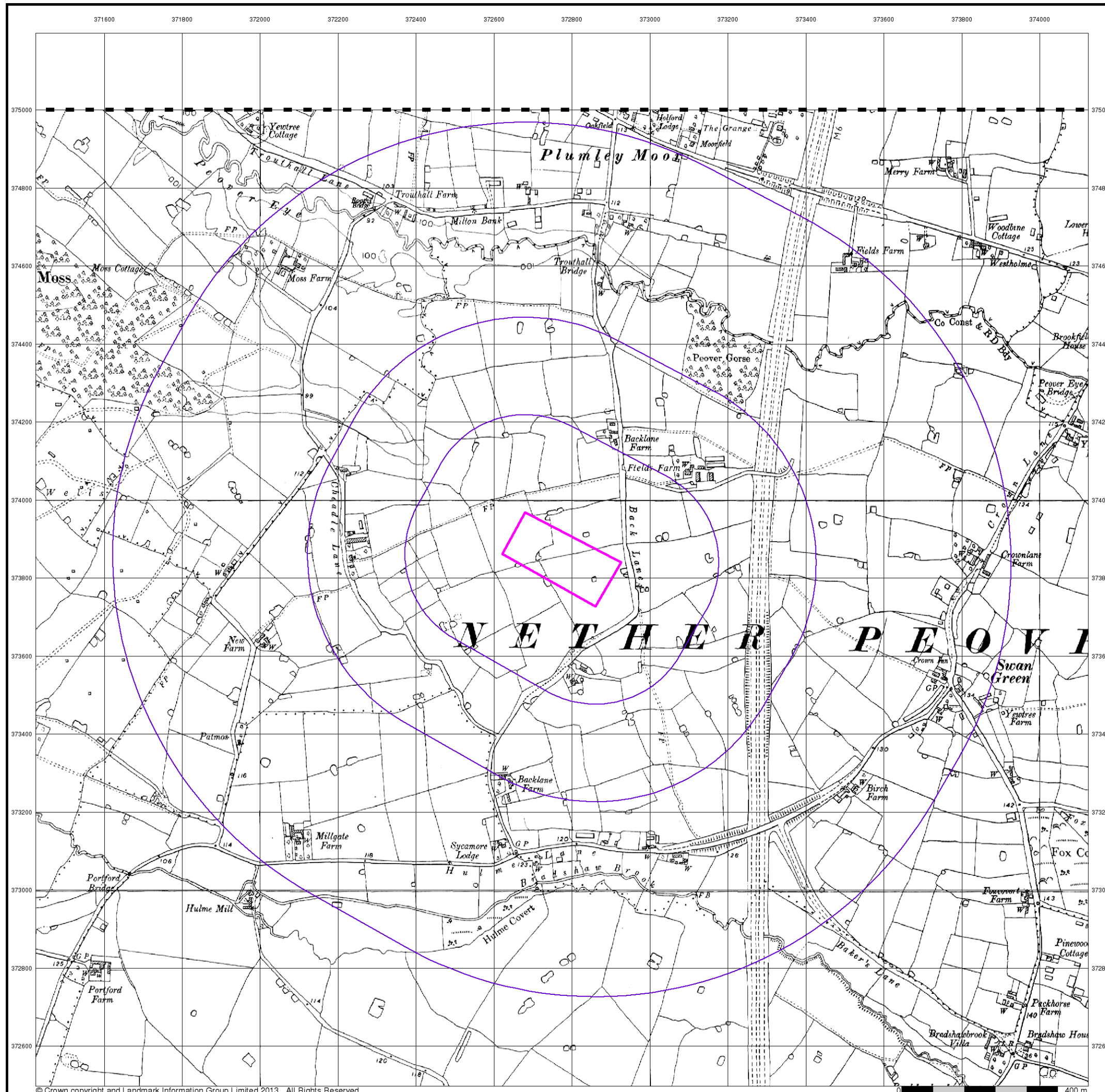


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Ordnance Survey Plan

Published 1975 - 1976

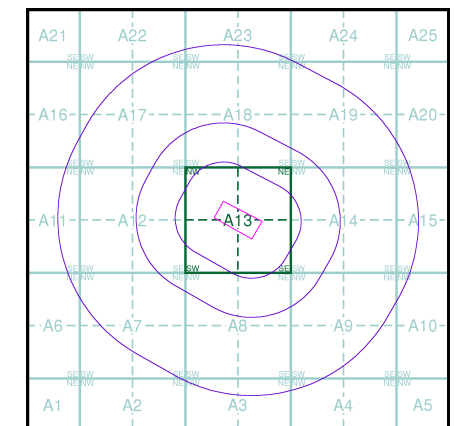
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Map Name(s) and Date(s)

SJ77NW	1976	1:10,000
SJ77SW	1975	1:10,000

Historical Map - Slice A

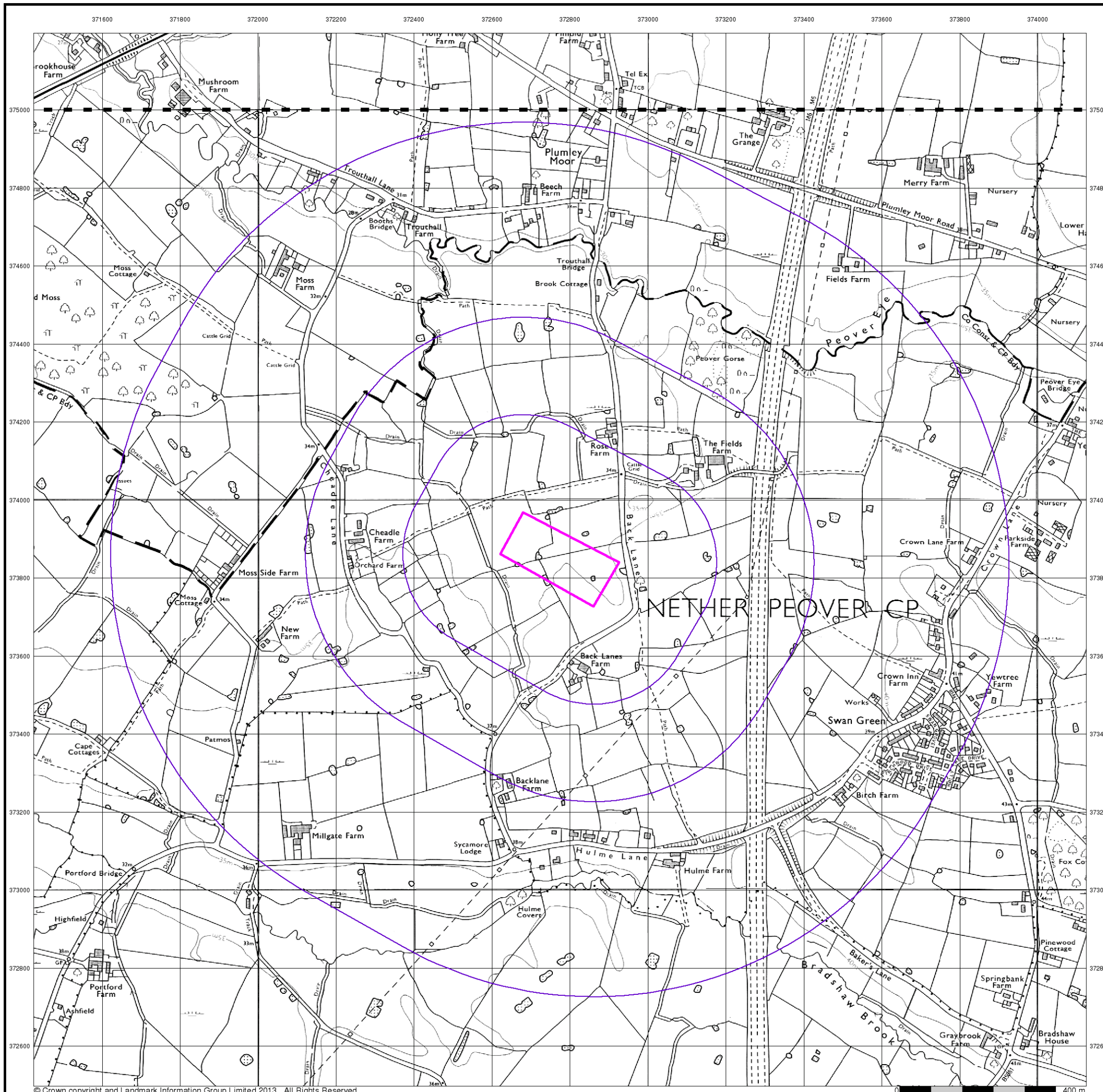


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



10k Raster Mapping

Published 2006

Source map scale - 1:10,000

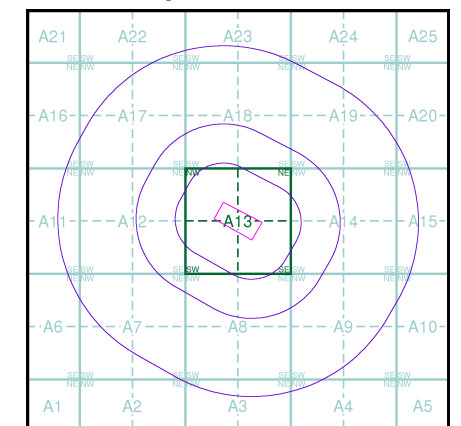
The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SJ77NW
2006
1:10,000

SJ77SW
2006
1:10,000

Historical Map - Slice A

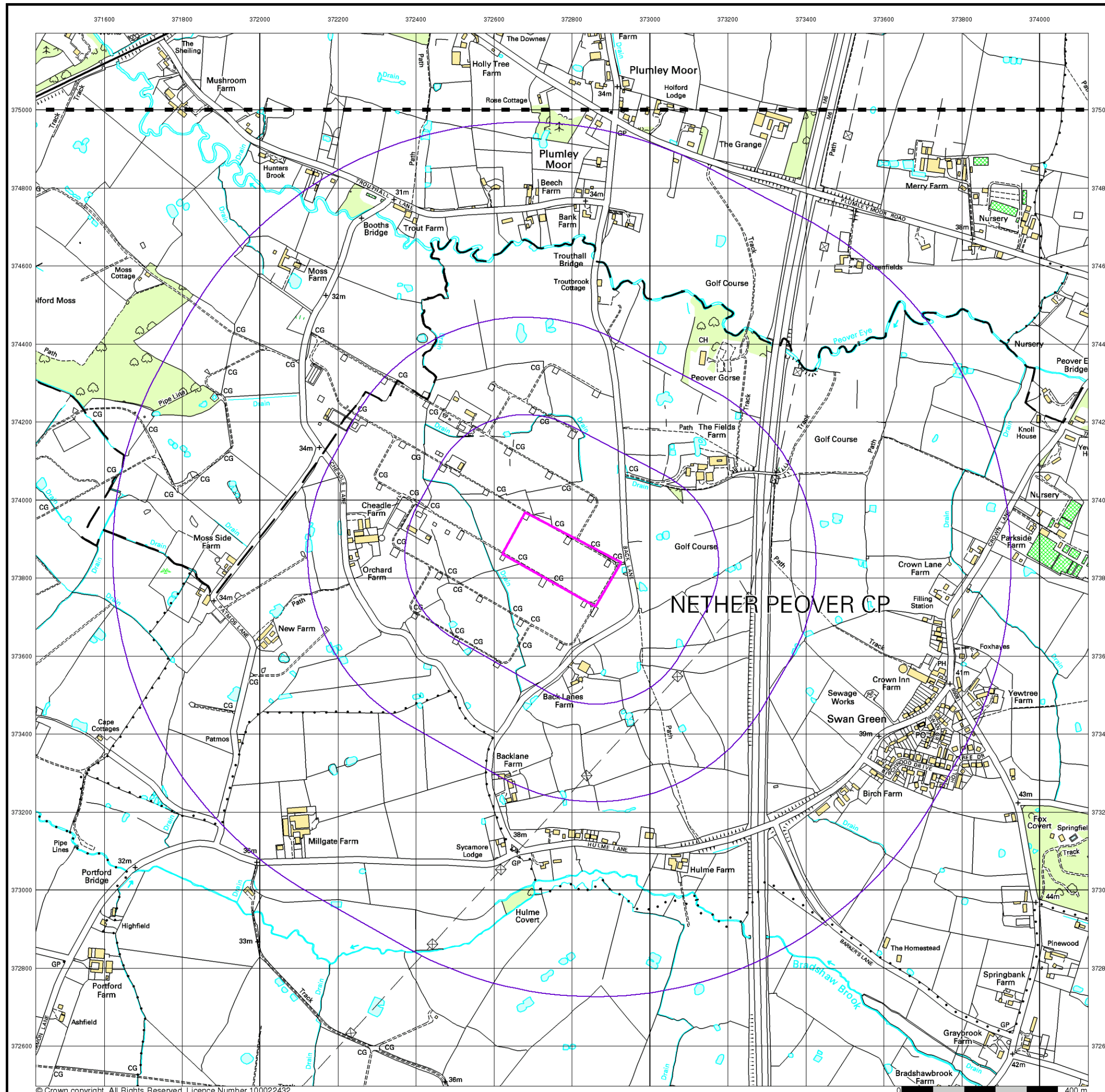


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



VectorMap Local

Published 2013

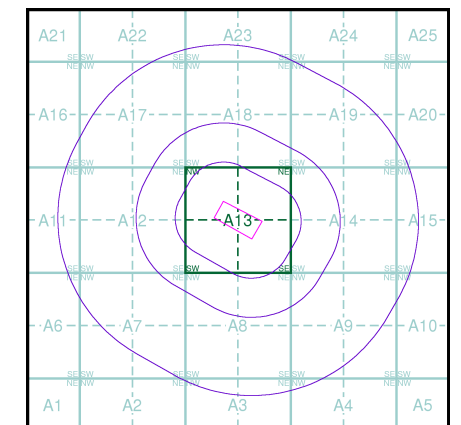
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

---	SJ77NW	---
---	2013	---
---	Variable	---
---		---
---	SJ77SW	---
---	2013	---
---	Variable	---

Historical Map - Slice A

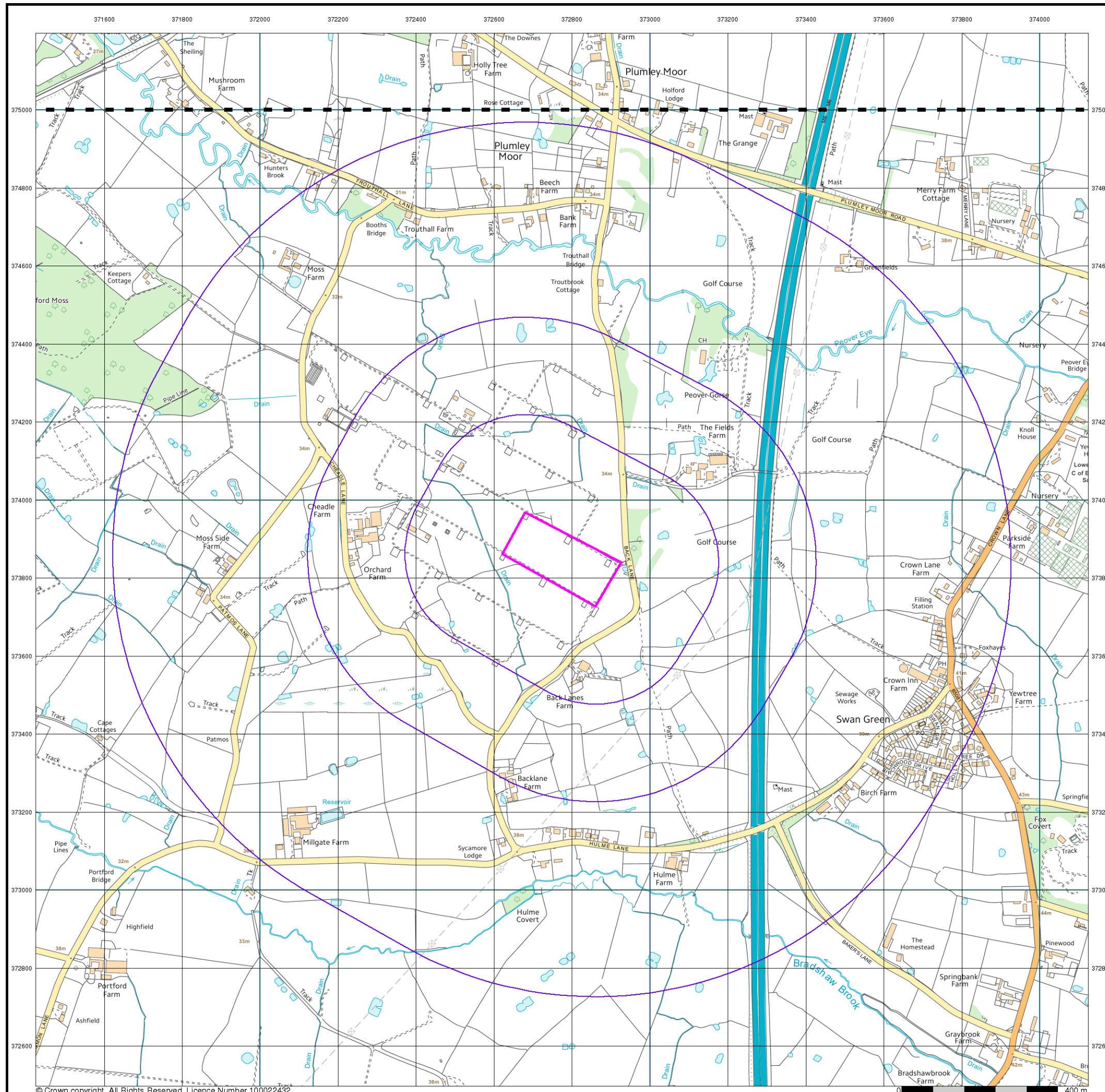


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
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Site Details

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Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

Quarry **Gravel Pit** **Sand Pit**
Clay Pit **Shingle** **Refuse Heap**
Sloping Masonry **Flat Rock**
Marsh **Reeds** **Osiers**
Rough Pasture **Furze** **Wood**
Mixed Wood **Brushwood** **Orchard**
Fir **Ford** **Stepping Stones**
Ferry **Waterfall** **Lock**
Trig. Station **Altitude at Trig. Station**
B.M. 325.9 **Bench Mark** **Surface Level**
Arrow denotes flow of water **Antiquities (site of)**
Cutting **Embankment**
Railway crossing Road **Level Crossing** **Road crossing Railway**
Railway crossing River or Canal **Road over single stream** **Road over River or Canal**
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
County Borough Boundary (England)
County Burgh Boundary (Scotland)
Co. Boro. Bdy.
Co. Burgh Bdy.
BP BS Boundary Post or Stone **P.C.B** Police Call Box
B.R. Bridle Road **P** Pump
E.P Electricity Pylon **S.P** Signal Post
F.B. Foot Bridge **SL** Sluice
F.P. Foot Path **Sp.** Spring
G.P Guide Post or Board **T.C.B** Telephone Call Box
M.S Mile Stone **Tr.** Trough
M.P M.R Mooring Post or Ring **W** Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

Inactive Quarry, Chalk Pit or Clay Pit **Active Quarry, Chalk Pit or Clay Pit**
Rock **Boulders**
Cliff **Slopes** **Top**
Roofed Building **Glazed Roof Building**
Sloping Masonry **Archway**
Non-Coniferous Tree (surveyed) **Coniferous Tree (surveyed)**
Non-Coniferous Trees (not surveyed) **Coniferous Trees (not surveyed)**
Orchard Tree **Scrub** **Bracken**
Coppice, Osier **Reeds** **Marsh, Saltings**
Rough Grassland **Heath** **Culvert**
Direction of water flow **Bench Mark** **Antiquity (site of)**
Cave Entrance **Triangulation Station** **Electricity Pylon**
Electricity Transmission Line
County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
London Borough Boundary
Symbol marking point where boundary mereing changes
BH Beer House **P** Pillar, Pole or Post
BP, BS Boundary Post or Stone **PO** Post Office
Cn, C Capstan, Crane **PC** Public Convenience
Chy Chimney **PH** Public House
D Fn Drinking Fountain **Pp** Pump
EI P Electricity Pillar or Post **SB, S Br** Signal Box or Bridge
FAP Fire Alarm Pillar **SP, SL** Signal Post or Light
FB Foot Bridge **Spr** Spring
GP Guide Post **Tk** Tank or Track
H Hydrant or Hydraulic **TCB** Telephone Call Box
LC Level Crossing **TCP** Telephone Call Post
MH Manhole **Tr** Trough
MP Mile Post or Mooring Post **Wr Pt, Wr T** Water Point, Water Tap
MS Mile Stone **W** Well
NTL Normal Tidal Limit **Wd Pp** Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250

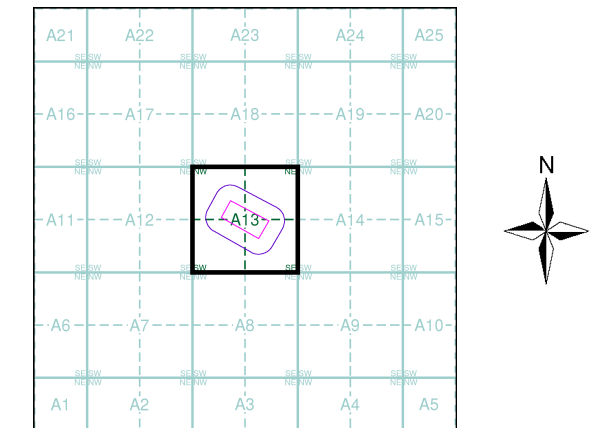
Cliff **Slopes** **Top**
Rock **Rock (scattered)**
Boulders **Boulders (scattered)**
Positioned Boulder **Scree**
Non-Coniferous Tree (surveyed) **Coniferous Tree (surveyed)**
Non-Coniferous Trees (not surveyed) **Coniferous Trees (not surveyed)**
Orchard Tree **Scrub** **Bracken**
Coppice, Osier **Reeds** **Marsh, Saltings**
Rough Grassland **Heath** **Culvert**
Direction of water flow **Triangulation Station** **Antiquity (site of)**
Electricity Transmission Line **Electricity Pylon**
B.M. 231.60m Bench Mark **Buildings with Building Seed**
Roofed Building **Glazed Roof Building**
Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)
Bks Barracks **P** Pillar, Pole or Post
Bty Battery **PO** Post Office
Cemy Cemetery **PC** Public Convenience
Chy Chimney **Pp** Pump
Cis Cistern **Ppg Sta** Pumping Station
Dismtd Rly Dismantled Railway **PW** Place of Worship
EI Gen Sta Electricity Generating Station **Sewage Ppg Sta** Sewage Pumping Station
EI P Electricity Pole, Pillar **SB, S Br** Signal Box or Bridge
EI Sub Sta Electricity Sub Station **SP, SL** Signal Post or Light
FB Filter Bed **Spr** Spring
Fn / D Fn Fountain / Drinking Ftn. **Tk** Tank or Track
Gas Gov Gas Valve Compound **Tr** Trough
GVC Gas Governor **Wd Pp** Wind Pump
GP Guide Post **Wr Pt, Wr T** Water Point, Water Tap
MH Manhole **Wks** Works (building or area)
MP, MS Mile Post or Mile Stone **W** Well



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Cheshire	1:2,500	1877	2
Cheshire	1:2,500	1898	3
Cheshire	1:2,500	1910	4
Ordnance Survey Plan	1:2,500	1968 - 1969	5
Supply of Unpublished Survey Information	1:2,500	1974	6
Additional SIMs	1:2,500	1990 - 1991	7
Large-Scale National Grid Data	1:2,500	1993	8

Historical Map - Segment A13



Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane,
 Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

Cheshire

Published 1877

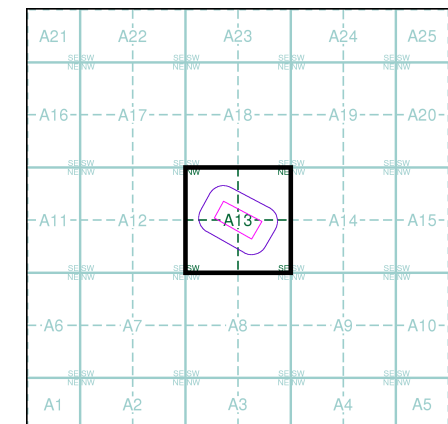
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

034_08	1877	1:2,500
034_12	1877	1:2,500

Historical Map - Segment A13

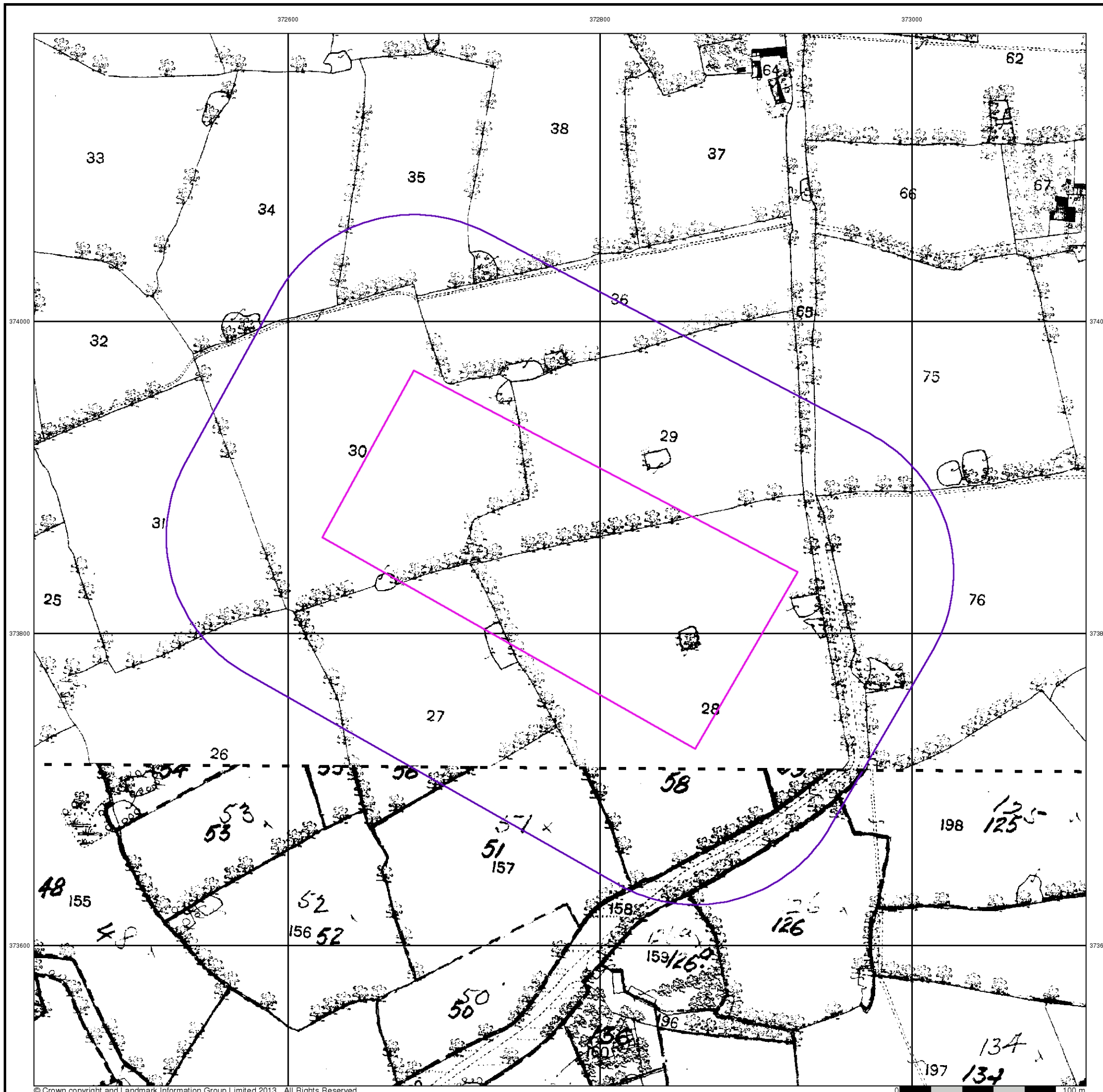


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane,
 Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Cheshire

Published 1898

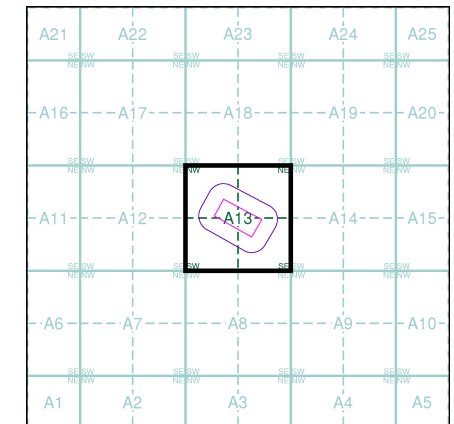
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

034_08	1898	1:2,500
034_12	1898	1:2,500

Historical Map - Segment A13

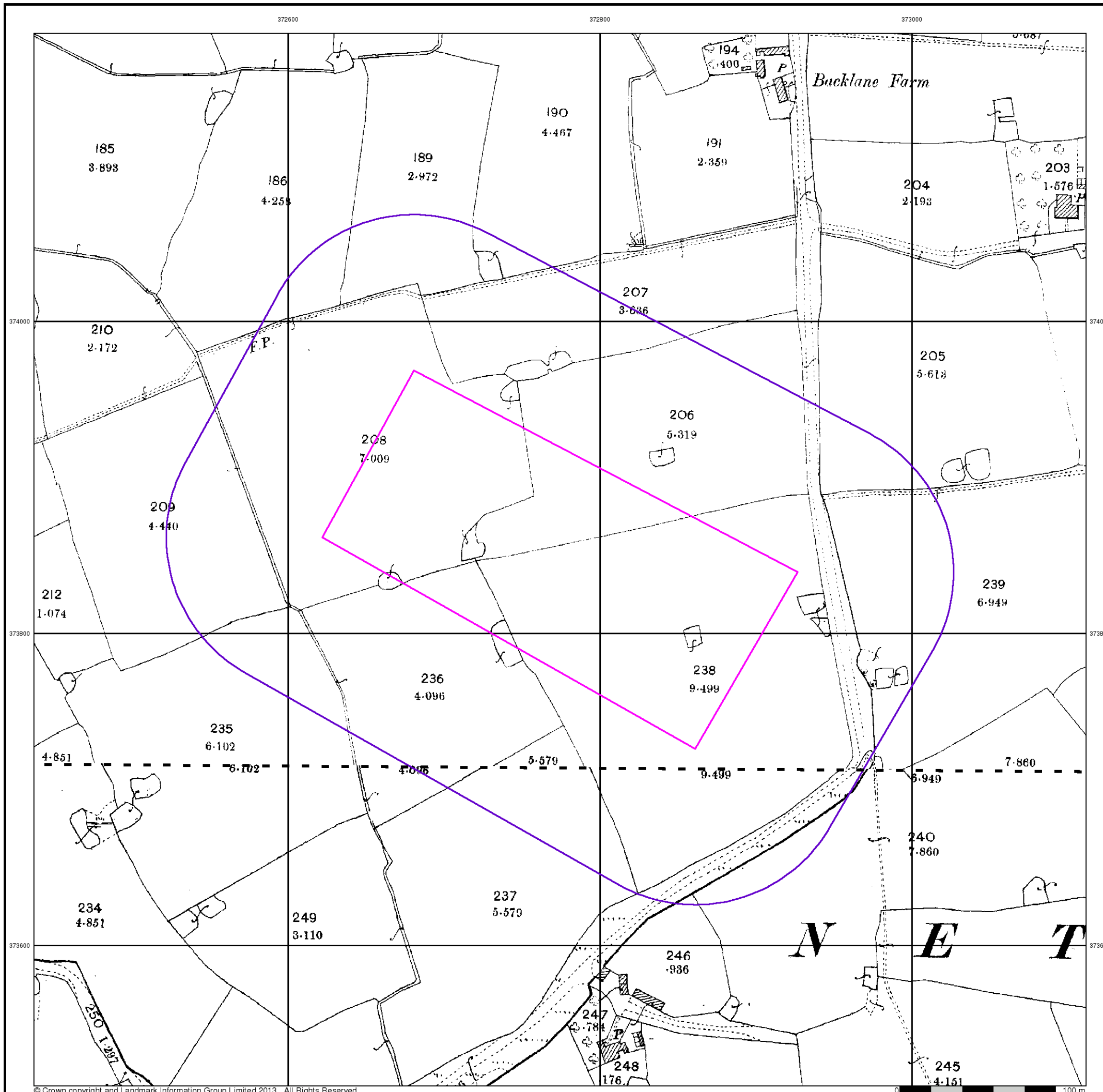


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Cheshire

Published 1910

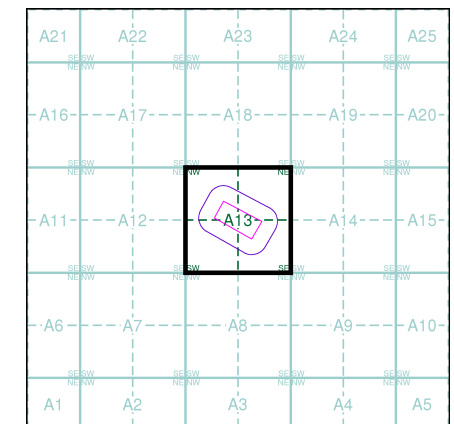
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

034_08	1910	1:2,500
034_12	1910	1:2,500

Historical Map - Segment A13

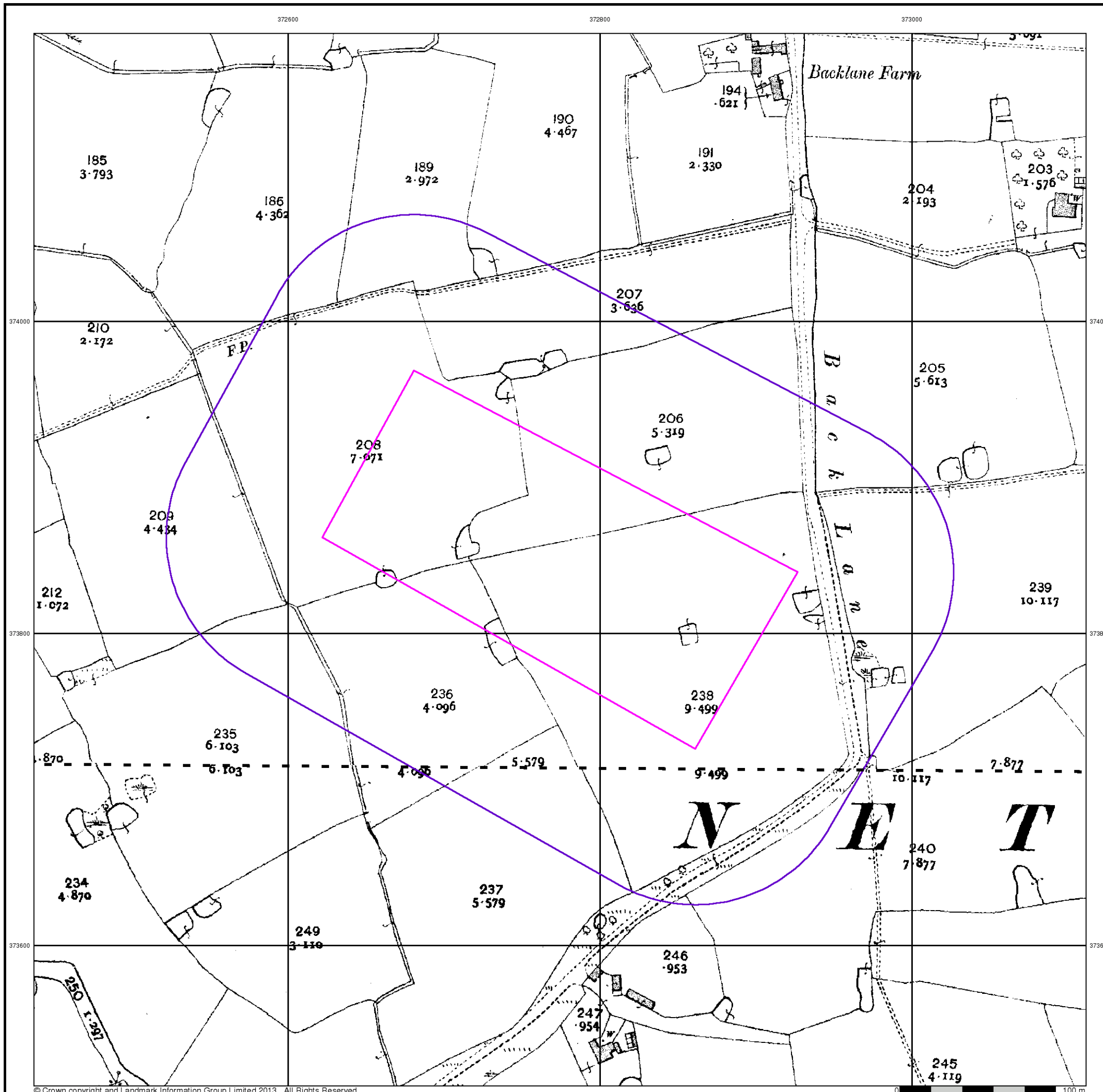


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Ordnance Survey Plan

Published 1968 - 1969

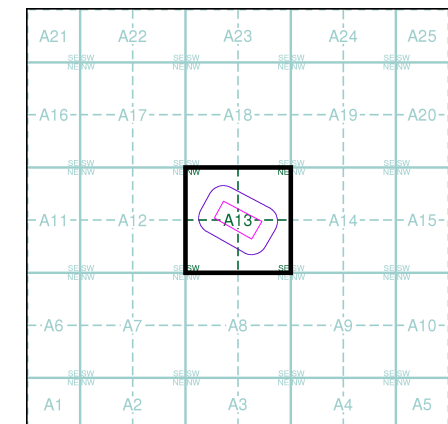
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ7274 1968 1:2,500	SJ7374 1968 1:2,500
SJ7273 1969 1:2,500	SJ7373 1969 1:2,500

Historical Map - Segment A13

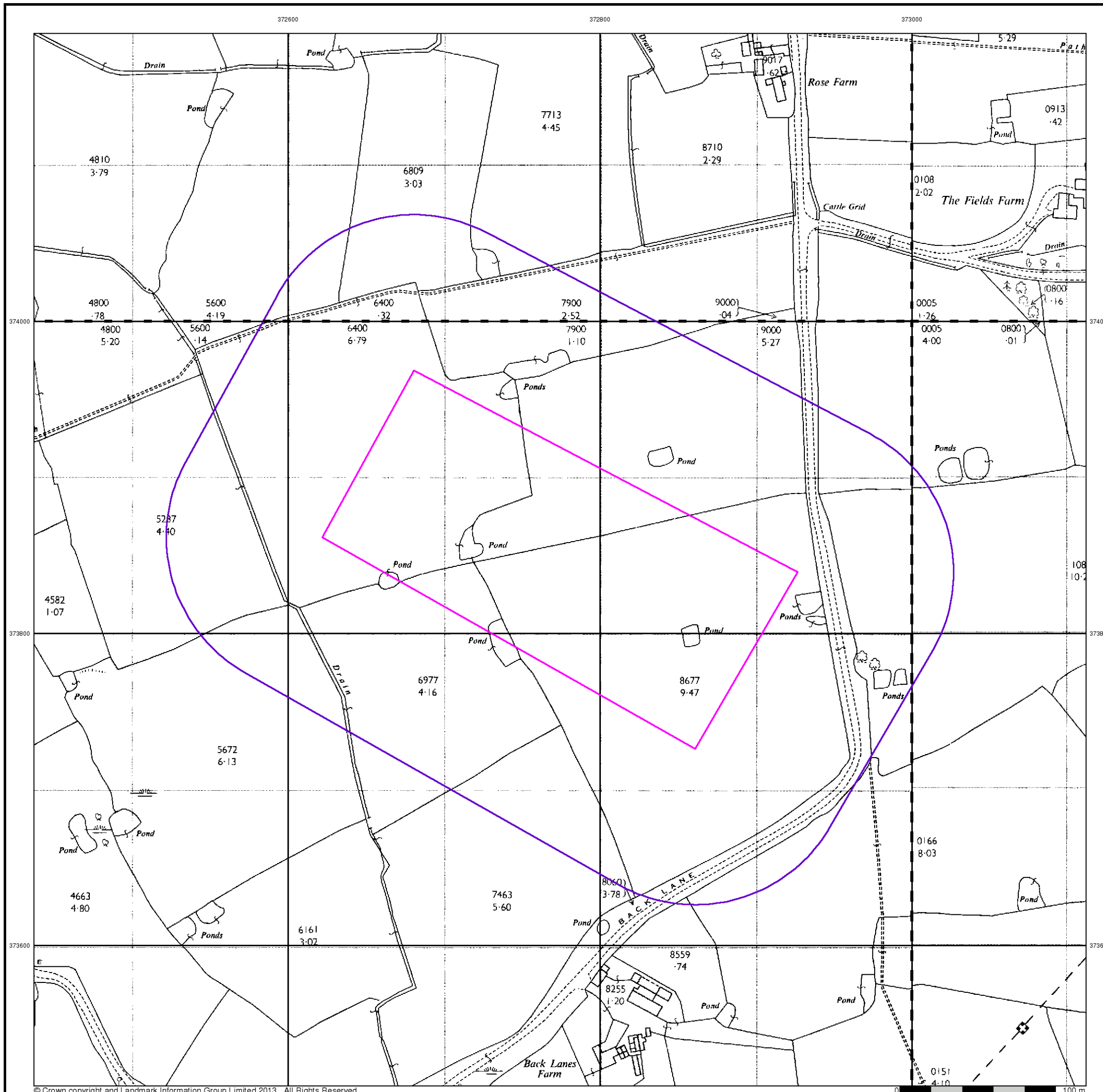


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



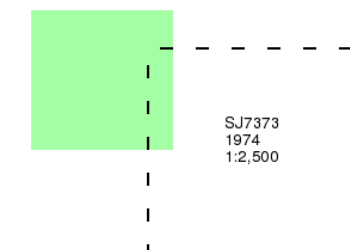
Supply of Unpublished Survey Information

Published 1974

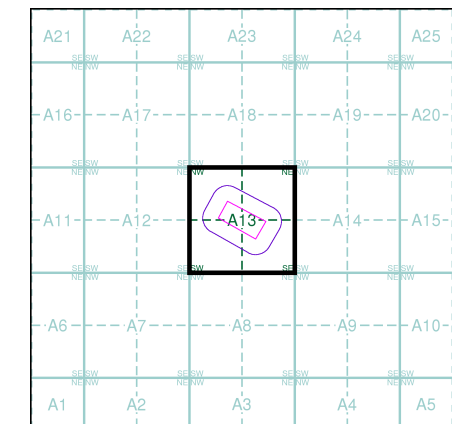
Source map scale - 1:2,500

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13

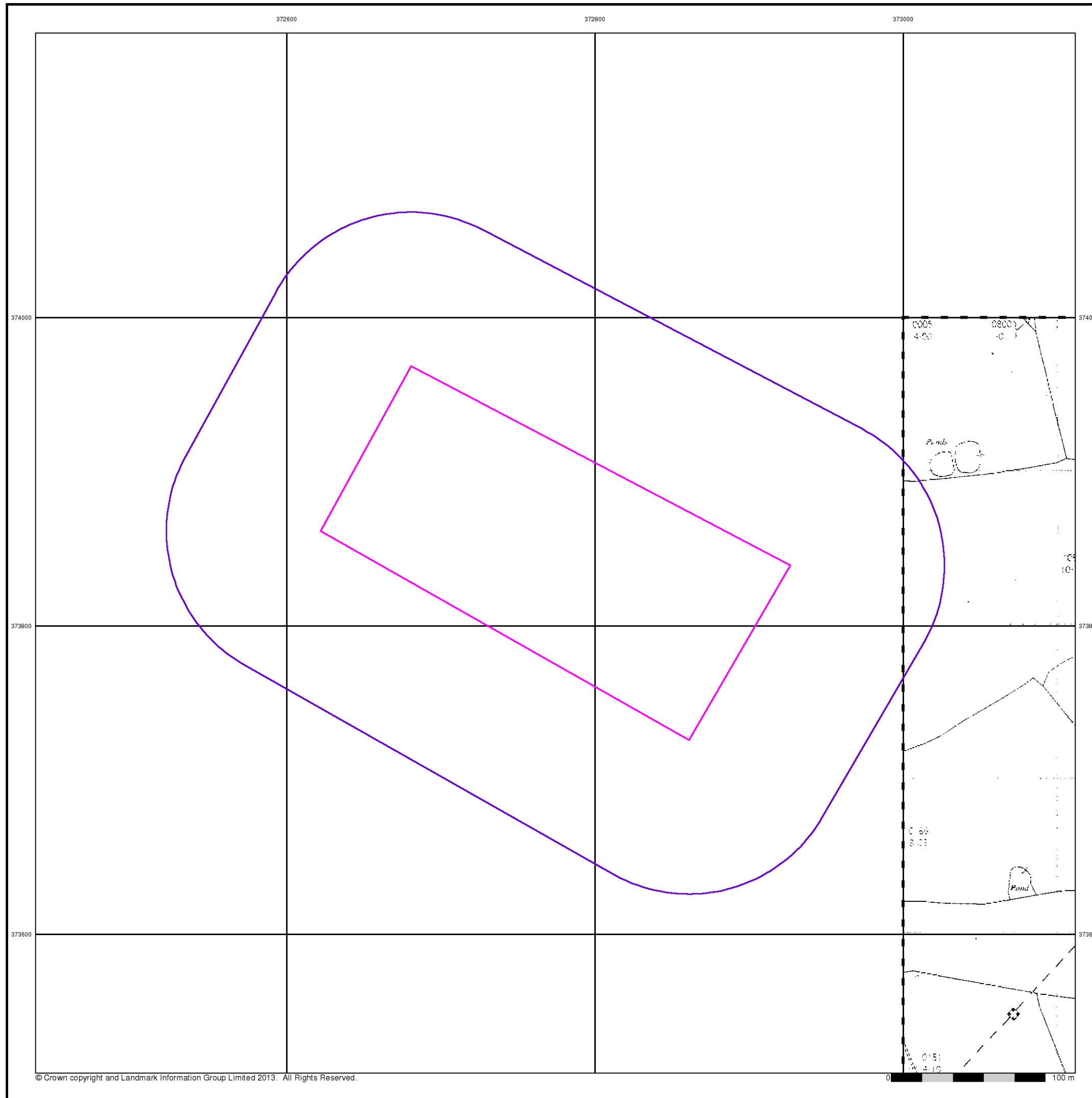


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane,
 Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Additional SIMs

Published 1990 - 1991

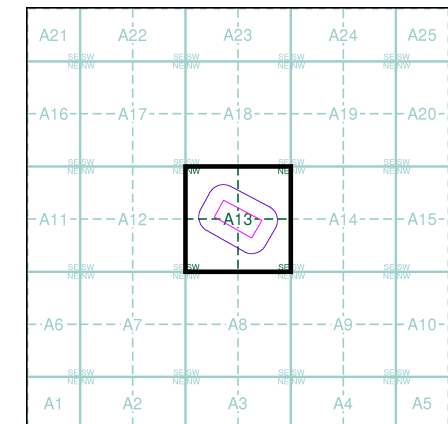
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SJ7274	SJ7374
1990	1990
12,500	12,500
SJ7273	SJ7373
1990	1991
12,500	12,500

Historical Map - Segment A13

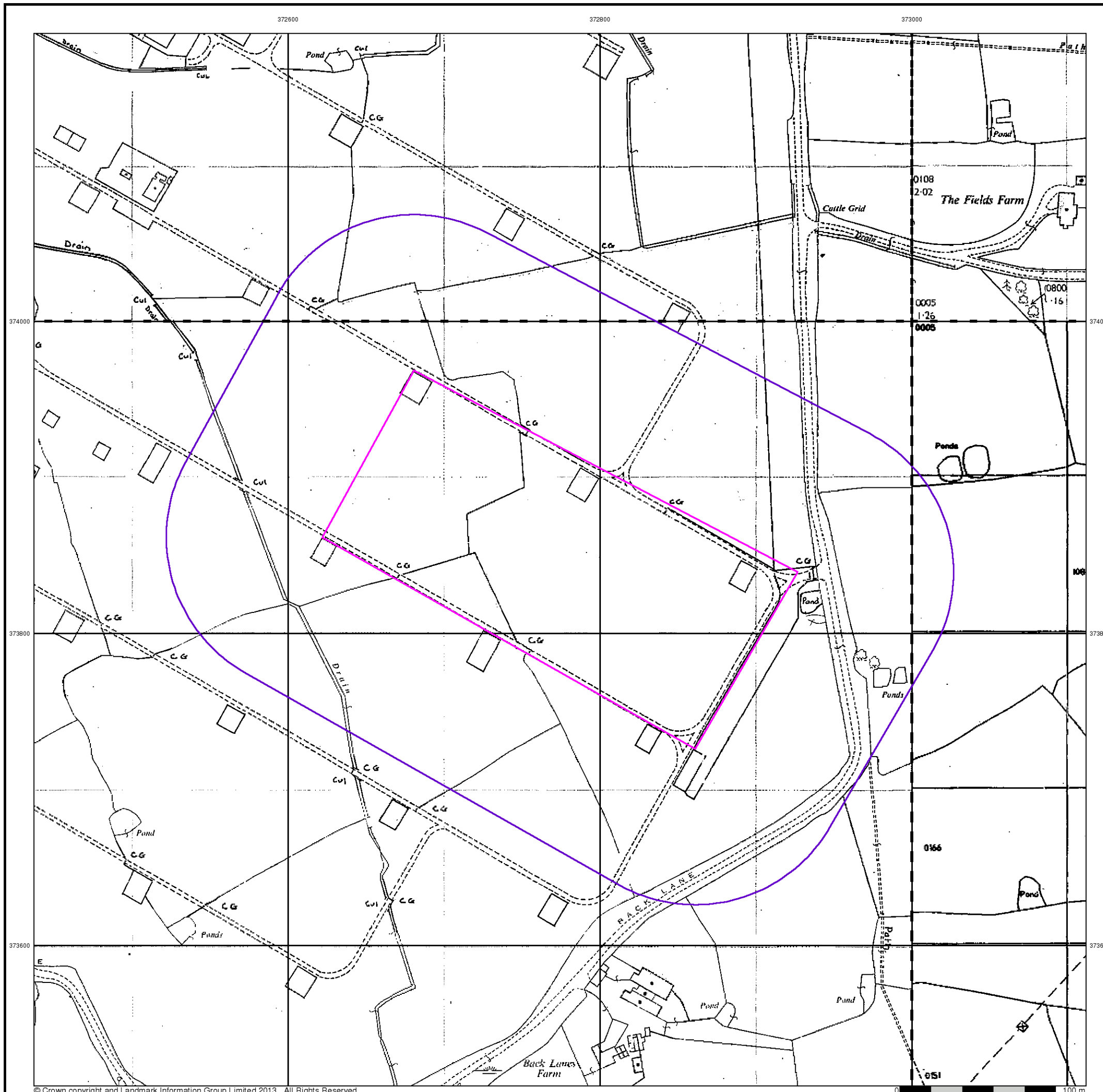


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



Large-Scale National Grid Data

Published 1993

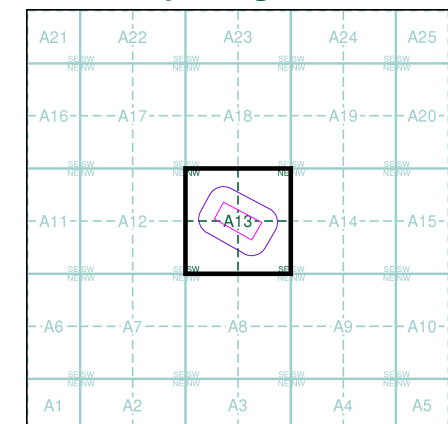
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SJ7274	SJ7374
1993	1993
1:2,500	1:2,500
SJ7273	SJ7373
1993	1993
1:2,500	1:2,500

Historical Map - Segment A13

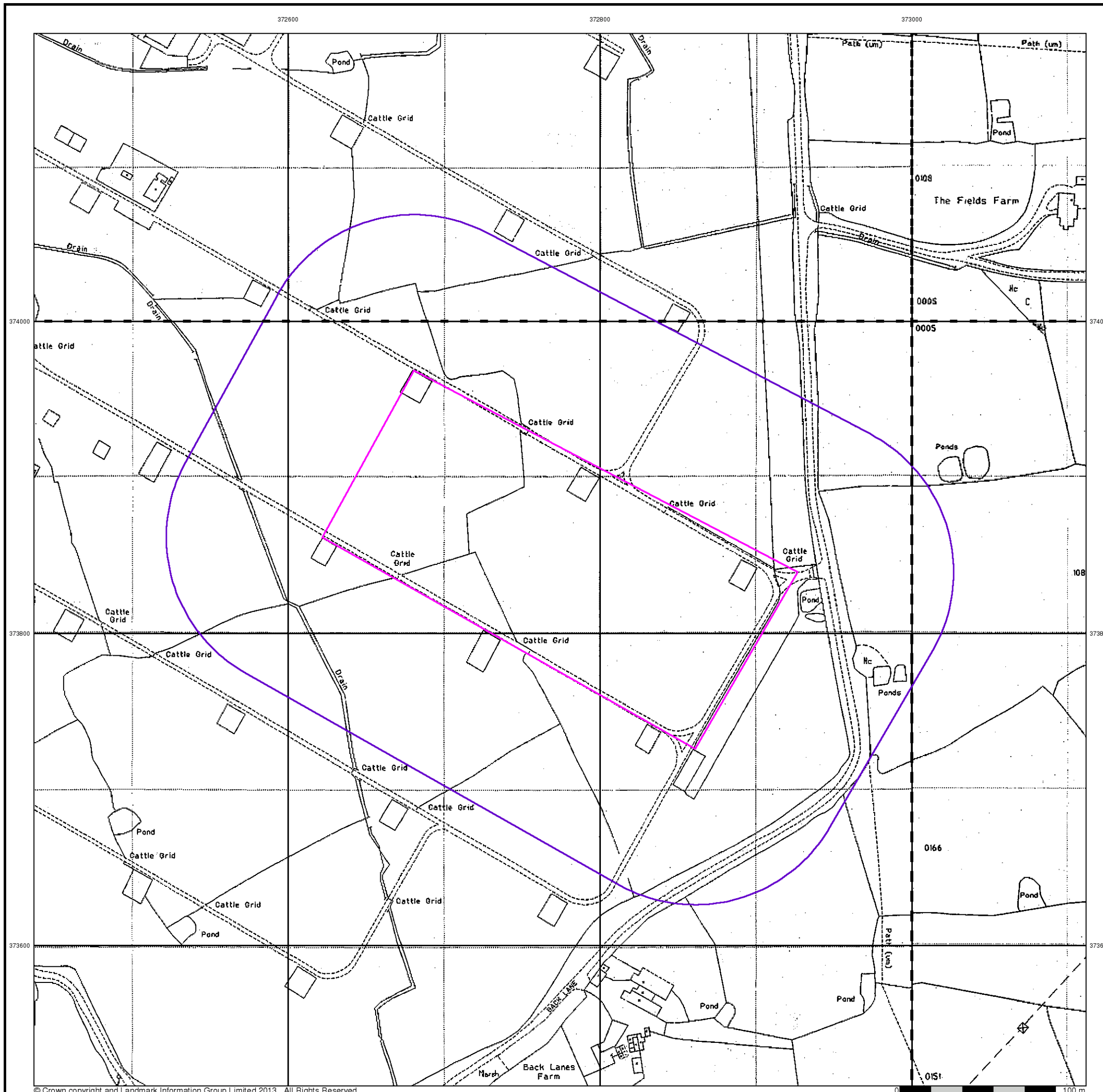


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 100

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice (Location)
- Discharge Consent
- ▲ Enforcement or Prohibition Notice
- ▲ Integrated Pollution Control
- ▲ Integrated Pollution Prevention Control
- ▲ Local Authority Integrated Pollution Prevention and Control
- ▲ Local Authority Pollution Prevention and Control Enforcement
- ▲ Pollution Incident to Controlled Waters
- ▲ Prosecution Relating to Authorised Processes
- ▲ Prosecution Relating to Controlled Waters
- ▲ Registered Radioactive Substance
- River Network or Water Feature
- + River Quality Sampling Point
- Substantiated Pollution Incident Register
- ◆ Water Abstraction
- ◆ Water Industry Act Referral

Waste

- ▼ BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- ▲ Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

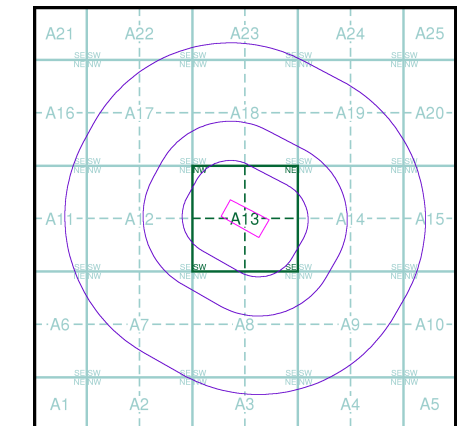
Geological

- ▼ BGS Recorded Mineral Site

Industrial Land Use

- ★ Contemporary Trade Directory Entry
- ★ Fuel Station Entry
- ✱ COMAH Site
- ✱ Explosive Site
- ✱ NIHS Site
- ✱ Planning Hazardous Substance Consent
- ✱ Planning Hazardous Substance Enforcement

Site Sensitivity Map - Slice A

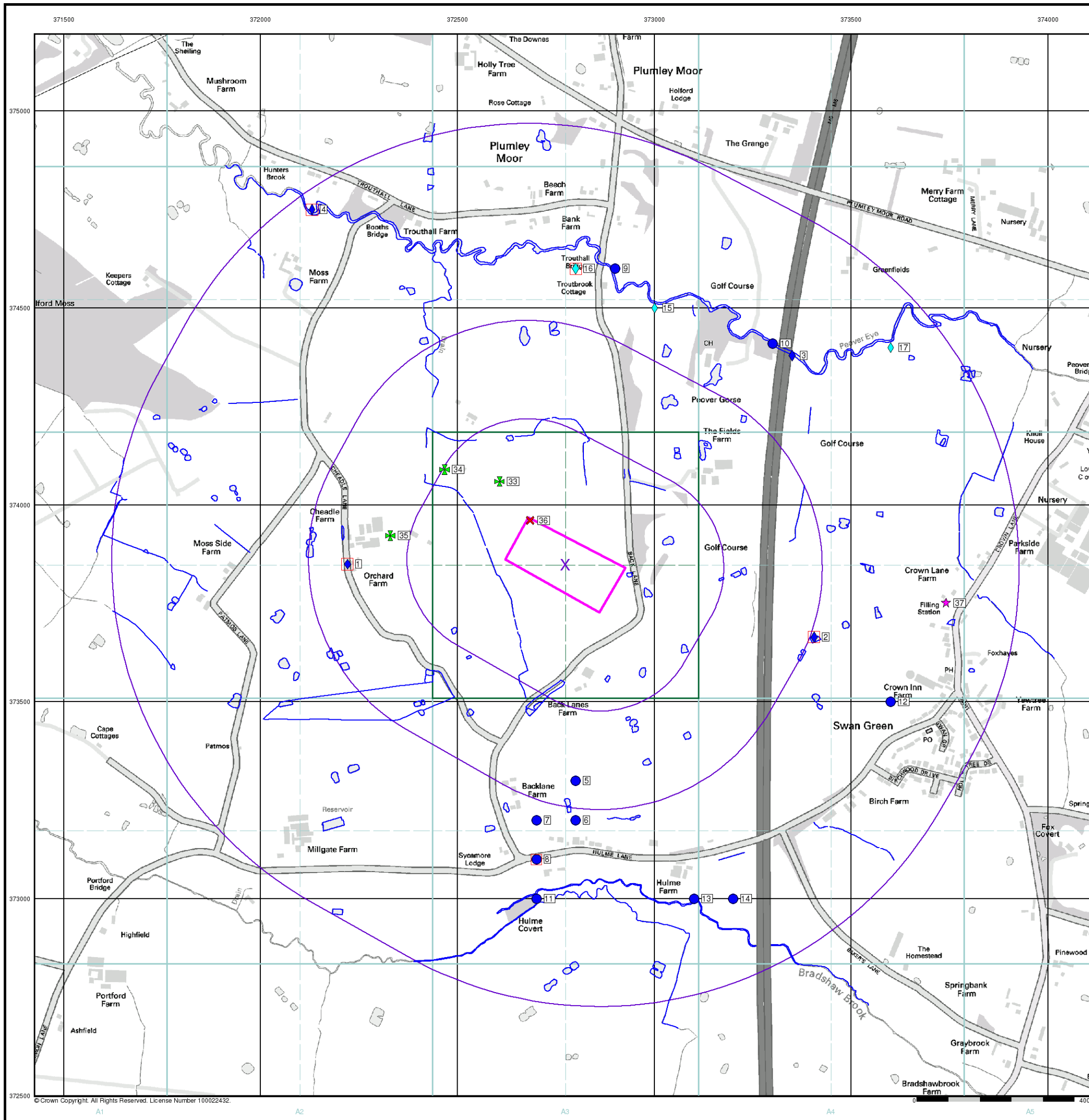


Order Details




Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details






Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



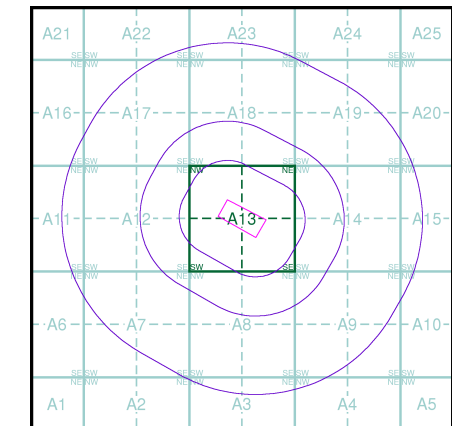
General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point

Agency and Hydrological (Flood)

-  Extreme Flooding from Rivers or Sea without Defences (Zone 2)
-  Flooding from Rivers or Sea without Defences (Zone 3)
-  Area Benefiting from Flood Defence
-  Flood Water Storage Areas
-  Flood Defence

Flood Map - Slice A

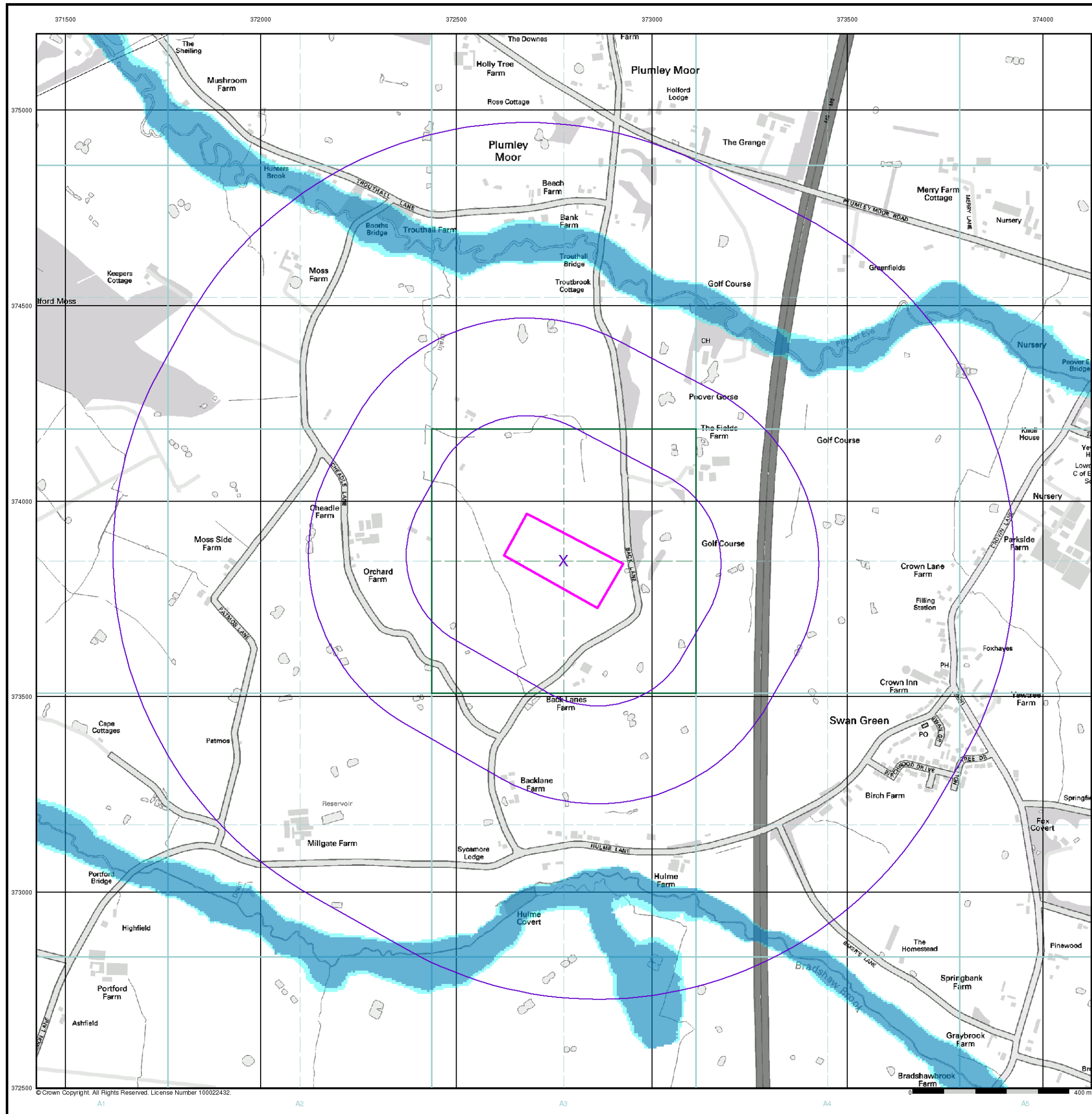


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



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General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

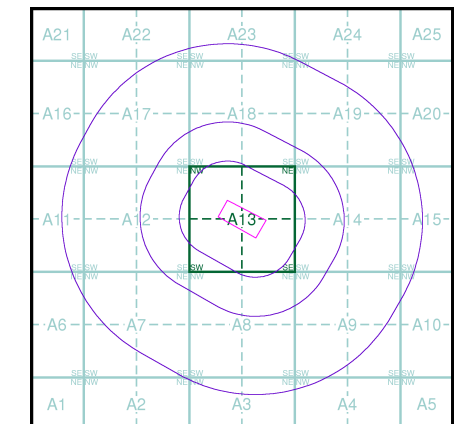
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A

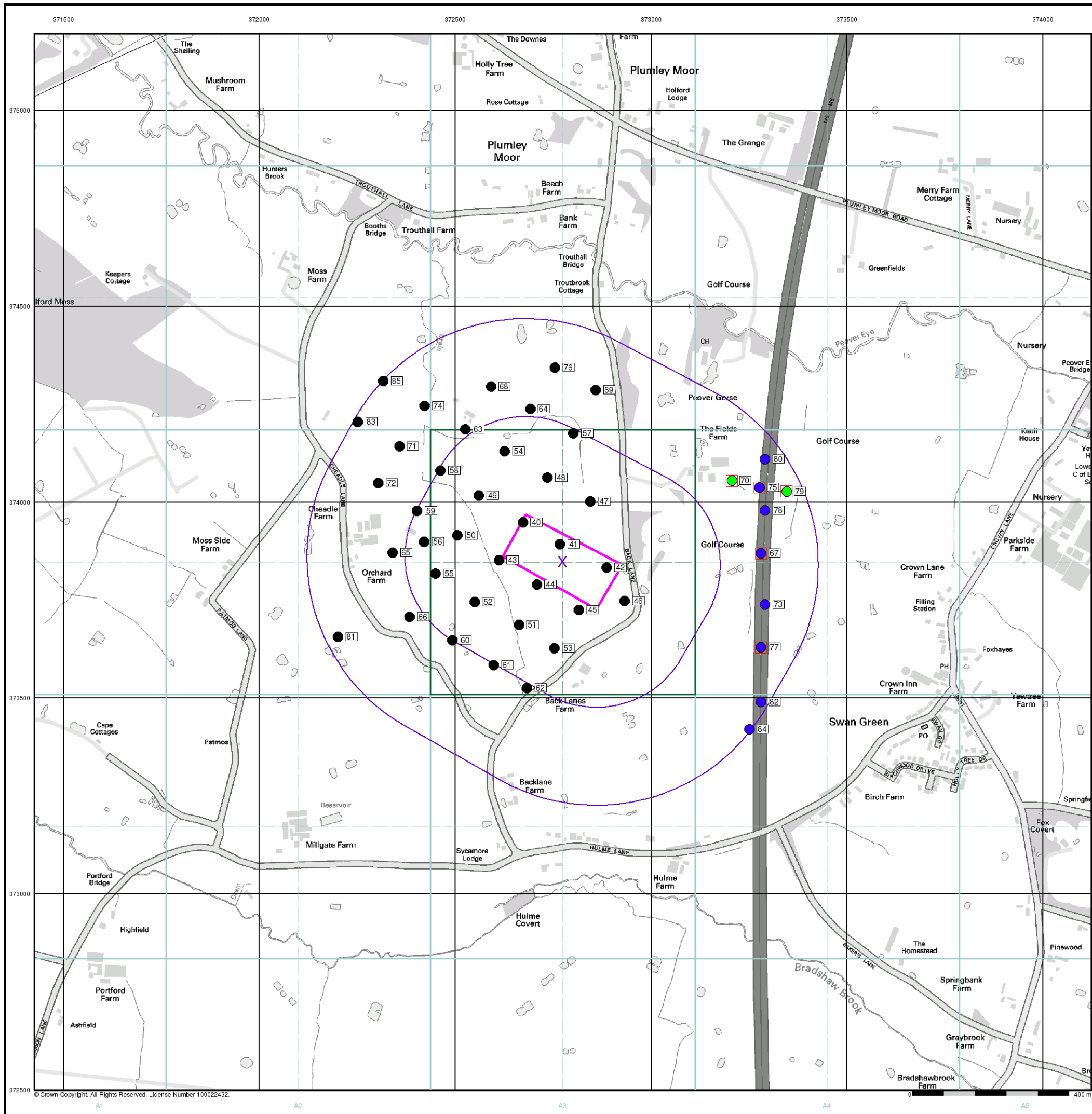


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID

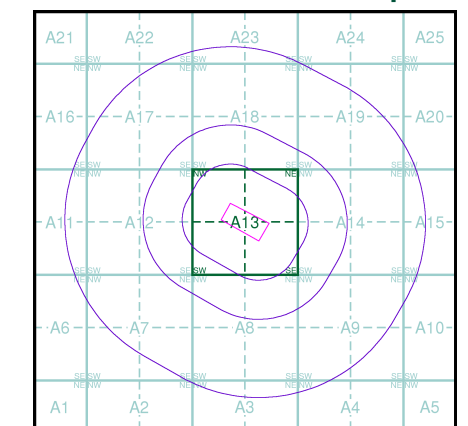
EA Detailed River Network Data

- Primary River
- Secondary River
- Tertiary River
- Canal
- Canal Tunnel
- Undefined River
- Lake/Reservoir
- Offline Drainage Feature
- Extended Culvert (greater than 50m)
- Underground River (inferred)
- Underground River (local knowledge)
- Downstream of High Water Mark
- Downstream of Seaward Extension
- Not assigned River feature

Contours (height in metres)

- Standard Contour 105
- Index Contour 100
- 167.3 Spot Height
- 45.8 Air Height

EA Detailed River Network Map - Slice A

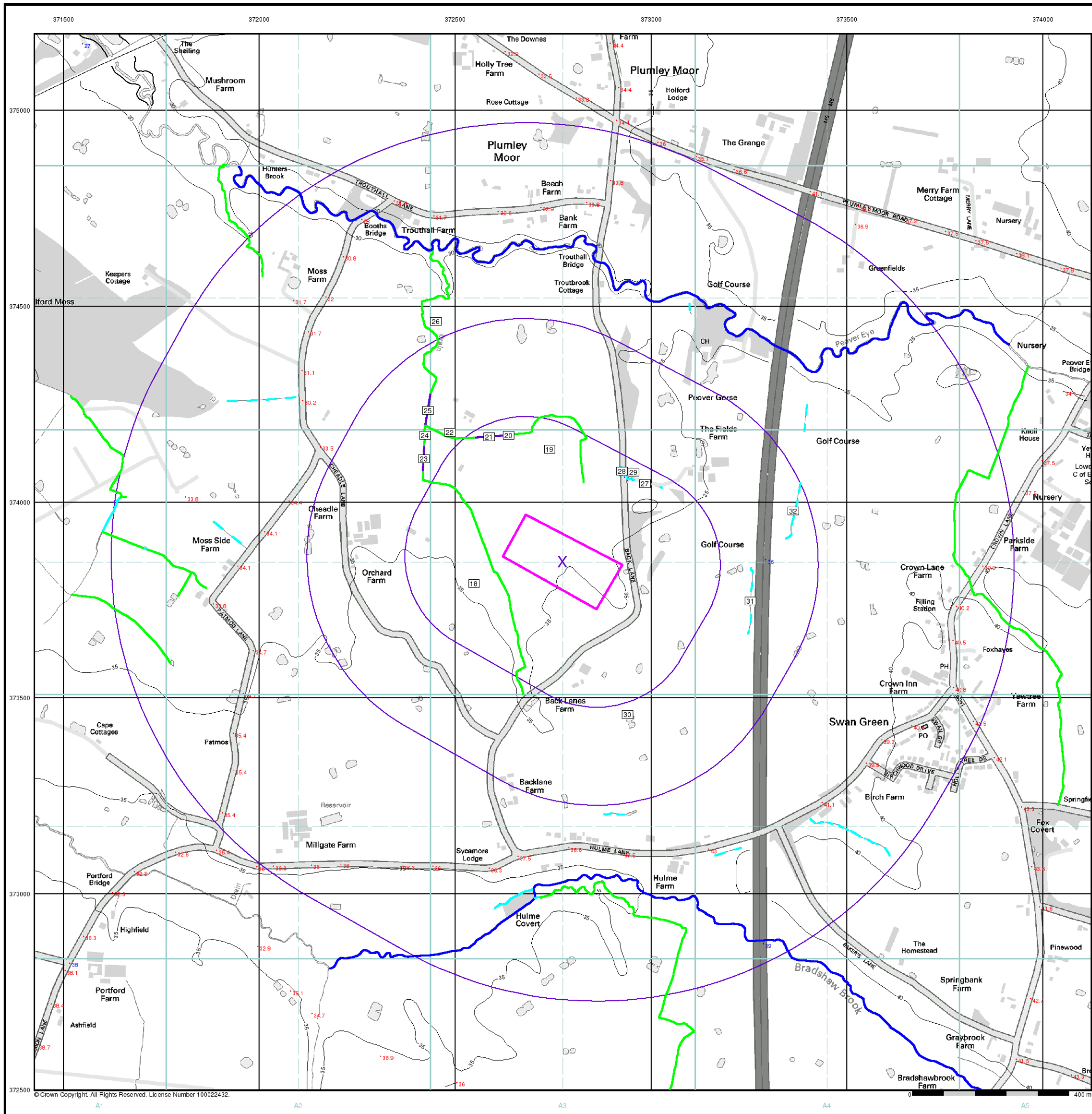


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

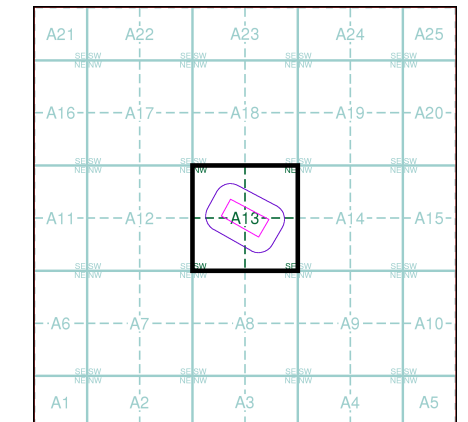
Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
 - Several of Type at Location
- Agency and Hydrological**
- Contaminated Land Register Entry or Notice (Location)
 - Contaminated Land Register Entry or Notice
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention Control
 - Local Authority Integrated Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control Enforcement
 - Pollution Incident to Controlled Waters
 - Prosecution Relating to Authorised Processes
 - Prosecution Relating to Controlled Waters
 - Registered Radioactive Substance
 - River Network or Water Feature
 - River Quality Sampling Point
 - Substantiated Pollution Incident Register
 - Water Abstraction
 - Water Industry Act Referral
- Waste**
- BGS Recorded Landfill Site (Location)
 - BGS Recorded Landfill Site
 - EA Historic Landfill (Buffered Point)
 - EA Historic Landfill (Polygon)
 - Integrated Pollution Control Registered Waste Site
 - Licensed Waste Management Facility (Landfill Boundary)
 - Licensed Waste Management Facility (Location)
 - Local Authority Recorded Landfill Site (Location)
 - Local Authority Recorded Landfill Site
 - Registered Landfill Site
 - Registered Landfill Site (Location)
 - Registered Landfill Site (Point Buffered to 100m)
 - Registered Landfill Site (Point Buffered to 250m)
 - Registered Waste Transfer Site (Location)
 - Registered Waste Transfer Site
 - Registered Waste Treatment or Disposal Site (Location)
 - Registered Waste Treatment or Disposal Site
- Hazardous Substances**
- COMAH Site
 - Explosive Site
 - NIHHS Site
 - Planning Hazardous Substance Consent
 - Planning Hazardous Substance Enforcement
- Geological**
- BGS Recorded Mineral Site
- Industrial Land Use**
- Contemporary Trade Directory Entry
 - Fuel Station Entry

Site Sensitivity Map - Segment A13

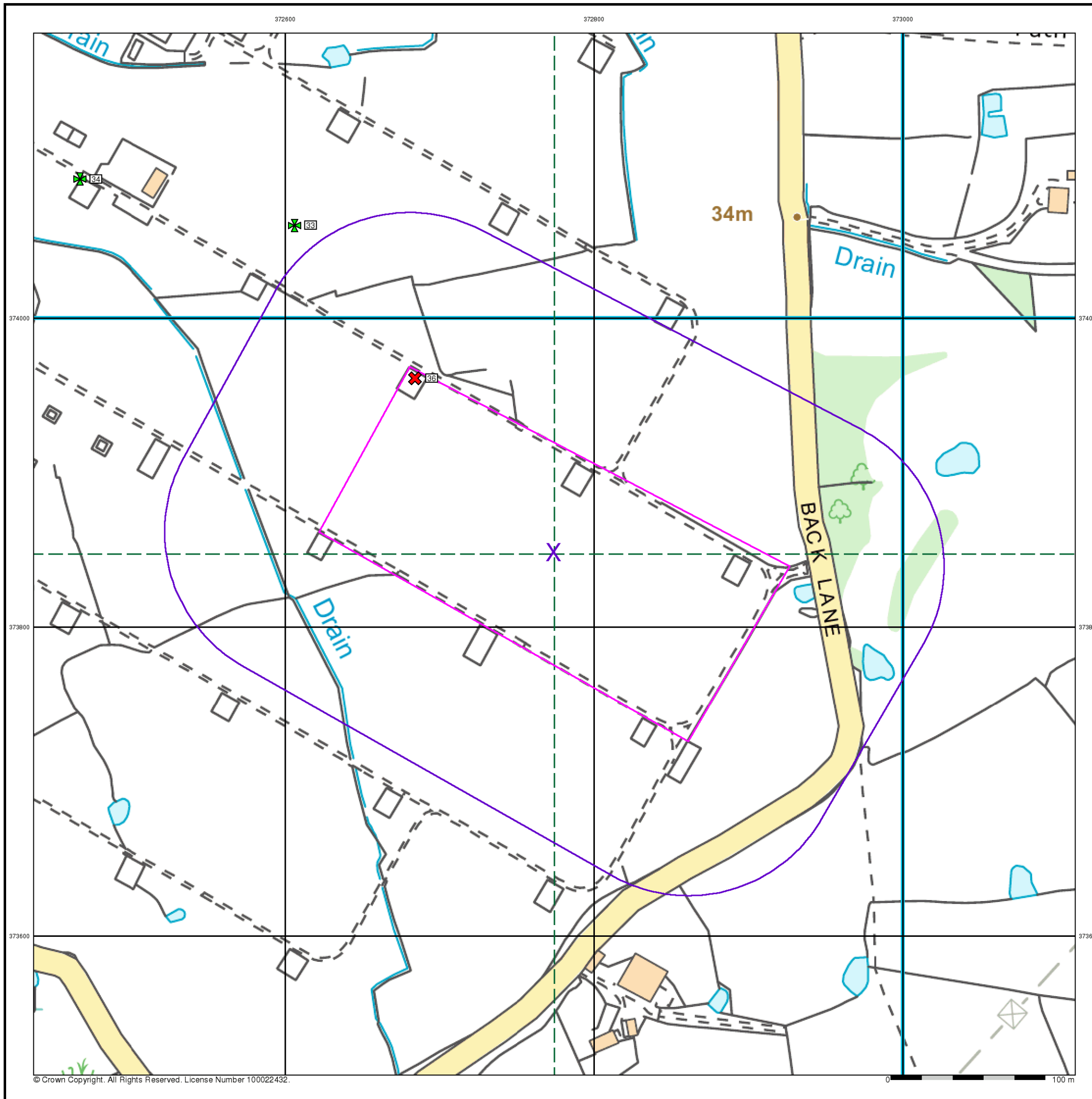


Order Details

Order Number: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ

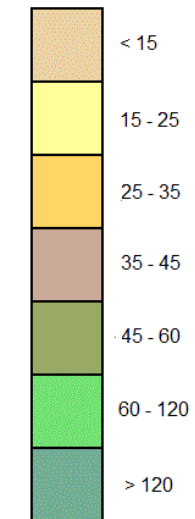


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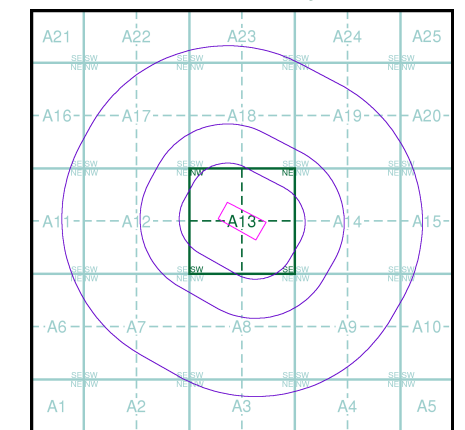
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg



Estimated Soil Chemistry Arsenic - Slice A

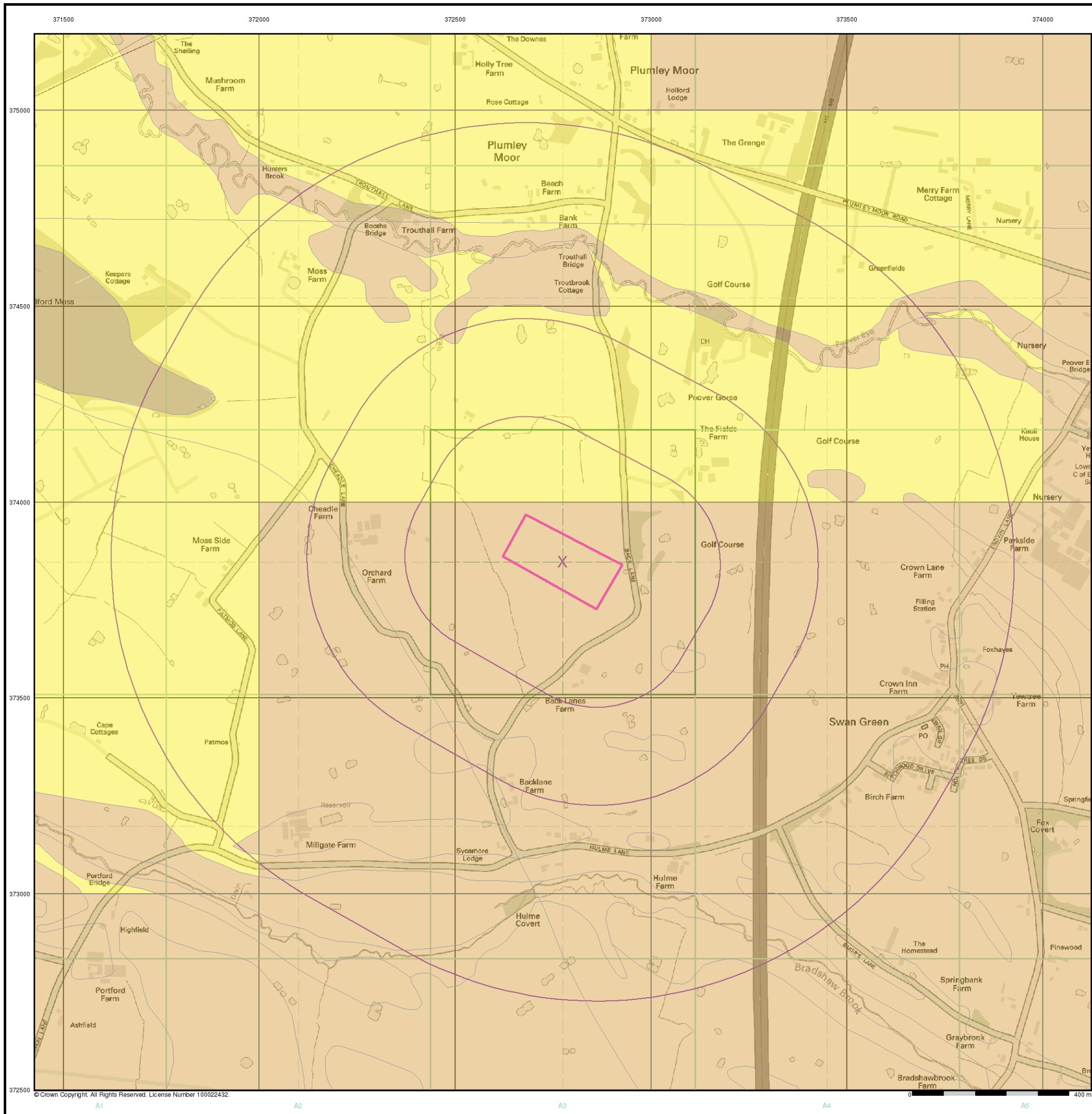


Order Details

Order Details: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



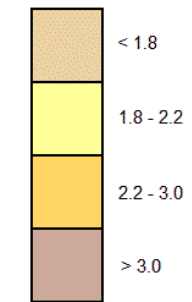
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General

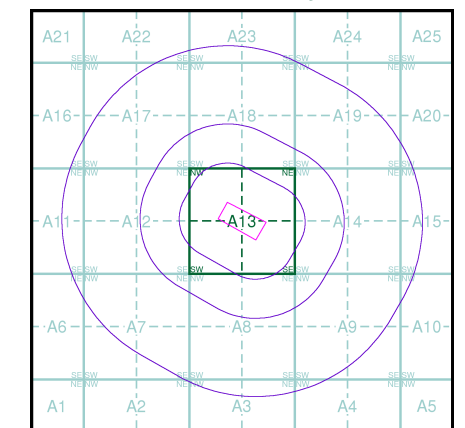
○ Specified Site
 ○ Specified Buffer(s)
 X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg



Estimated Soil Chemistry Cadmium - Slice A

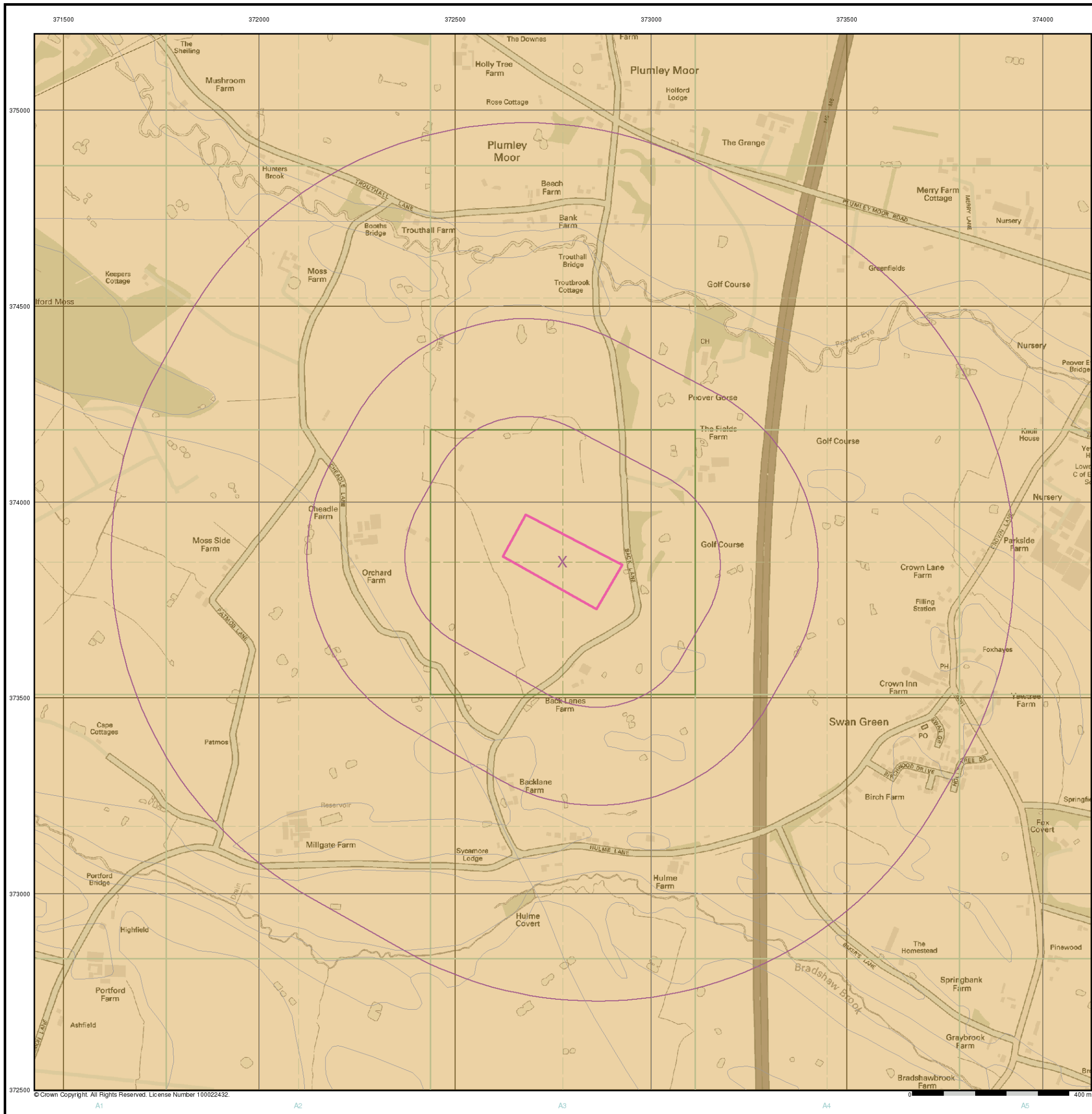


Order Details

Order Details: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane,
 Plumley, KNUTSFORD, Cheshire, WA16 9SJ



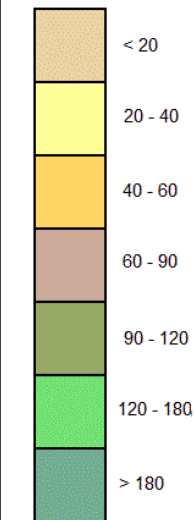
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General

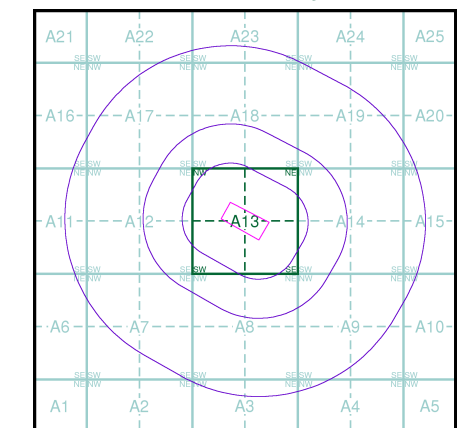
○ Specified Site
 ○ Specified Buffer(s)
 ✕ Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg



Estimated Soil Chemistry Chromium - Slice A

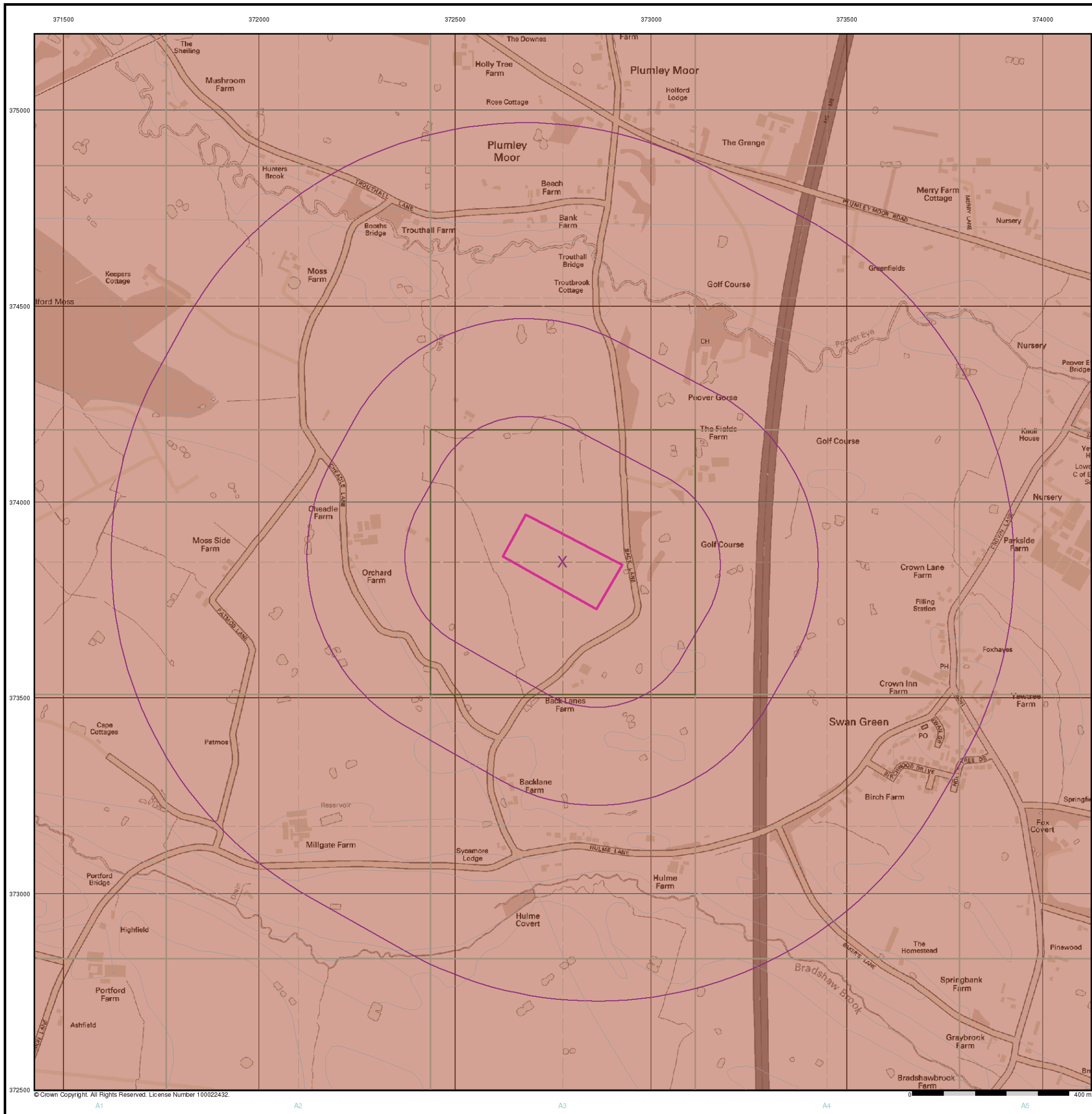


Order Details

Order Details: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane,
 Plumley, KNUTSFORD, Cheshire, WA16 9SJ

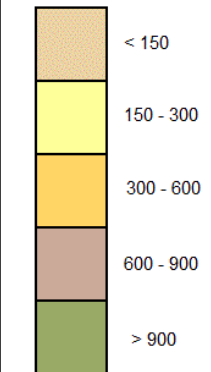


General

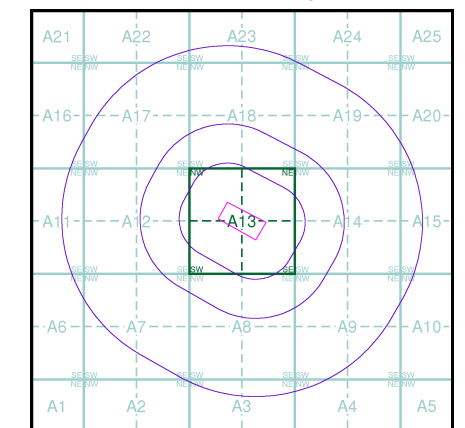
○ Specified Site
 ○ Specified Buffer(s)
 x Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg



Estimated Soil Chemistry Lead - Slice A

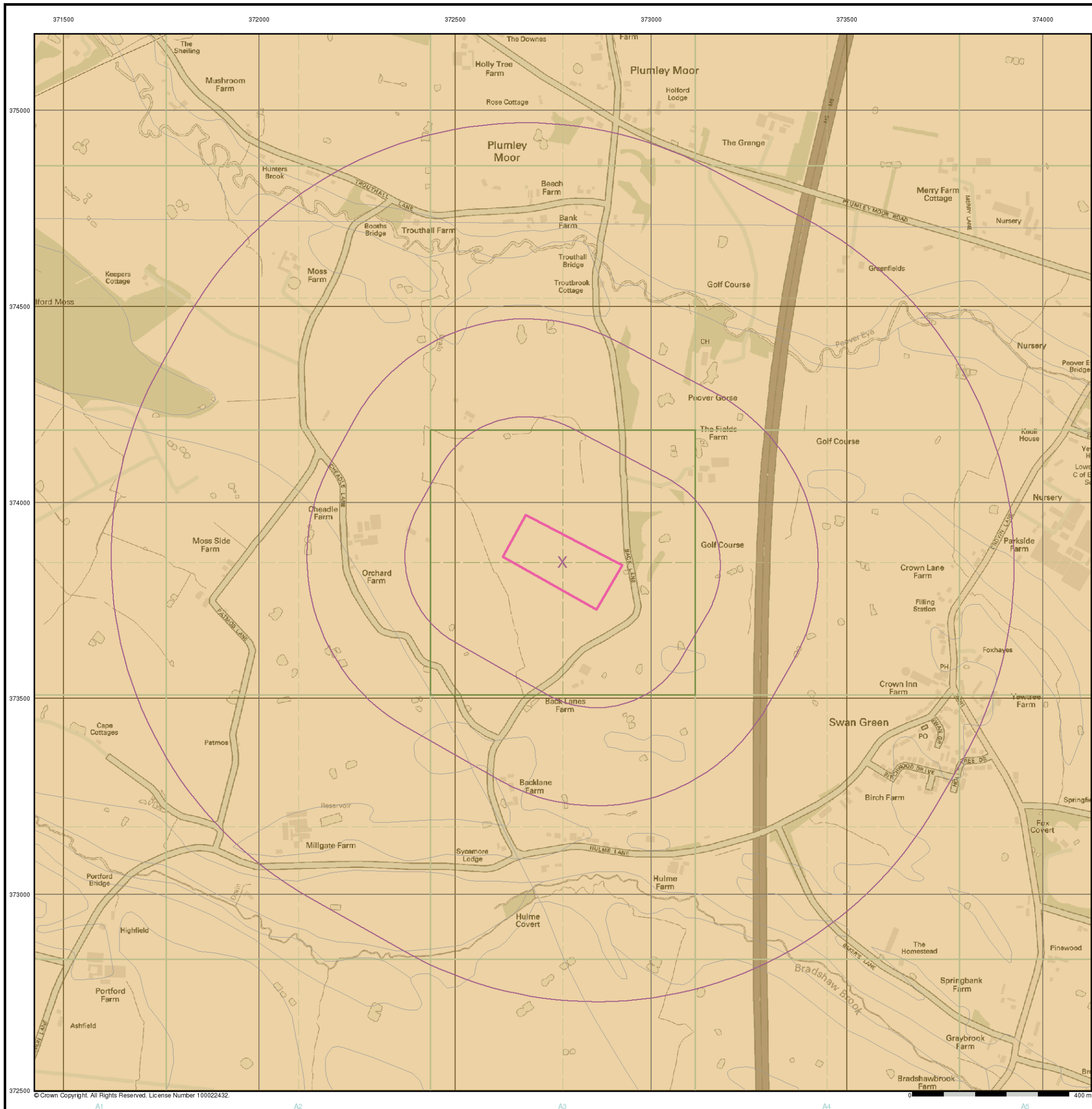


Order Details

Order Details: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane,
 Plumley, KNUTSFORD, Cheshire, WA16 9SJ

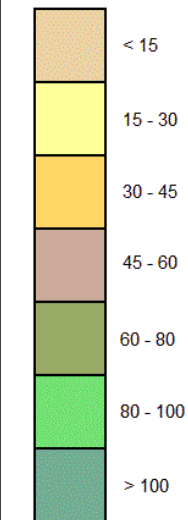


General

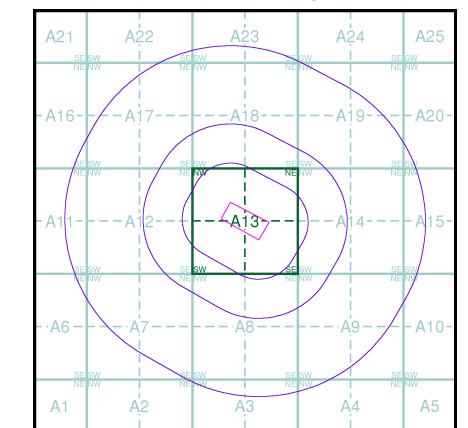
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg



Estimated Soil Chemistry Nickel - Slice A

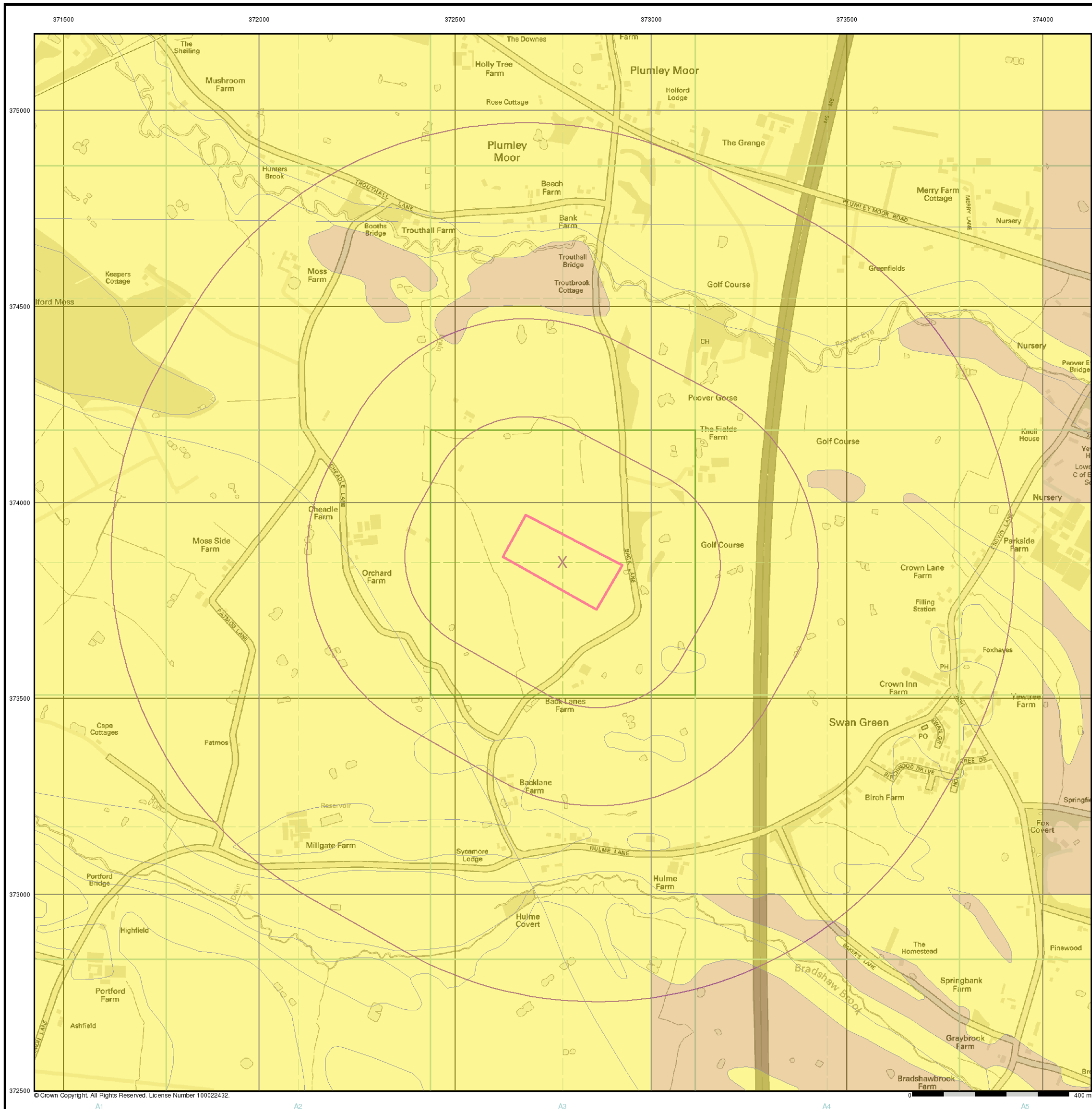


Order Details

Order Details: 53976325_1_1
 Customer Ref: Project Lindis
 National Grid Reference: 372770, 373850
 Slice: A
 Site Area (Ha): 3.5
 Search Buffer (m): 1000

Site Details

Project Delicious, Cape of Good Hope Farm, Back Lane, Plumley, KNUTSFORD, Cheshire, WA16 9SJ



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Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0845 762 6848 DX 716176 MANSFIELD 5

**LANDMARK INFORMATION GROUP
LIMITED
SOWTON INDUSTRIAL ESTATE
ABBAY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY**

Our reference: **51000485806002**
Your reference: **53976325_2|**
Date of your enquiry: **06 March 2014**
Date we received your enquiry: **06 March 2014**
Date of issue: **06 March 2014**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

**SITE AT PROJECT DELICIOUS, CAPE OF GOOD HOPE FARM, BACK LANE, PLUMLEY,
KNUTSFORD, CHESHIRE,**

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	No
Brine Compensation District	See comments below

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Information from the Cheshire Brine Subsidence Compensation Board

The property is situated within the Cheshire Brine Subsidence Compensation District but is not within any consultation area prescribed by the Board under Section 38(1) of the Cheshire Brine Pumping (Compensation for Subsidence) Act 1952.

A Notice of Damage has not been filed in respect of the property and there has been no commutation of claims in connection therewith.

If claims in respect of the property have not been commuted, then should the property suffer damage at some future date through subsidence due to brine pumping, the compensation provisions of the Cheshire Brine Pumping (Compensation for Subsidence) Acts 1952 and 1964 would be expected to apply to the property. Should you wish to file a Prescribed Notice of Damage, please contact the Cheshire Brine Subsidence Compensation Board (tel: 0845 002 0562 or email info@cheshirebrine.com).

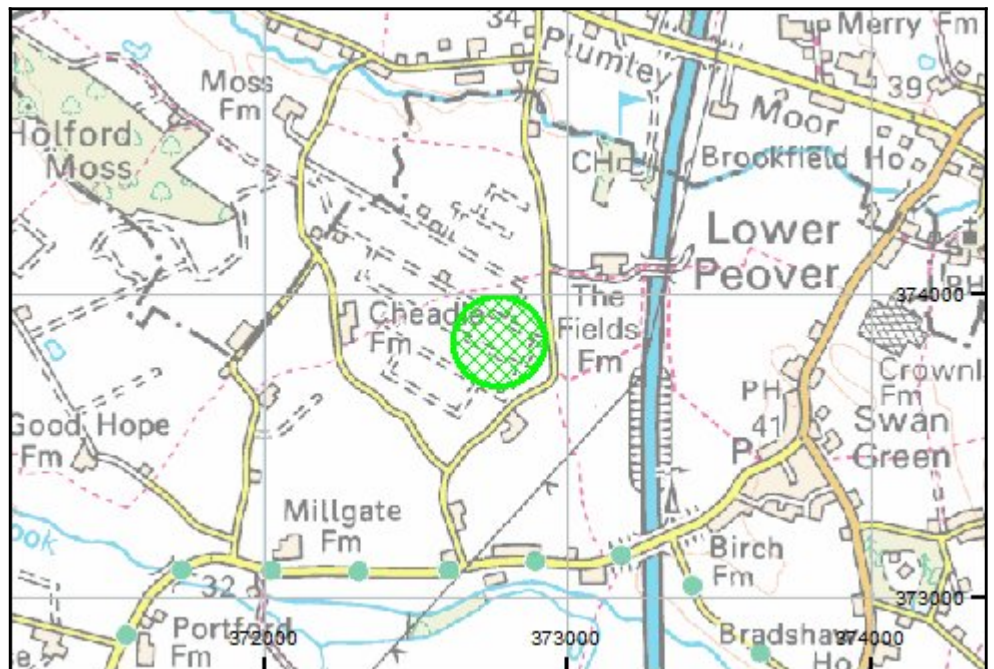
Additional Remarks

This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006. The Coal Authority owns the copyright in this report. The information we have used to write this report is protected by our database right. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

Location map



Approximate position of property

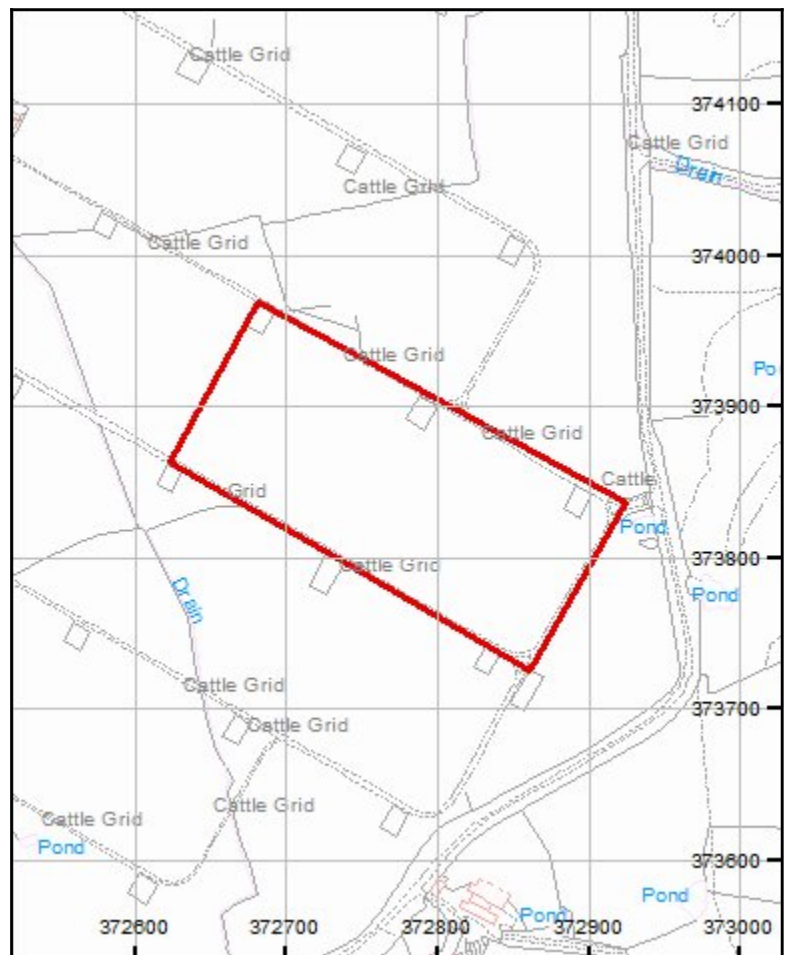


Enquiry boundary

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Key

Approximate position of enquiry boundary shown



SJ77SW 277
73324 74757

Sampling					Strata			
Depth	Type	Casing Depth	Date/Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend
			20/04 1993		TOPSOIL** [Topsoil]	G.L. (0.45)	35.81	
0.45-1.00	SD		DRY	11	Firm orange-brown mottled grey silty sandy CLAY with occasional gravel. [Glacial Till]	0.45	35.36	
1.25-1.50	SD	1.50	DRY	10	Below 1.50m: dark orange-brown with a little fine and medium gravel.			
2.20-2.40	SD	1.50	DRY	11		(4.15)		
3.25-3.80	SD	3.00	DRY	16	Below 3.35m: firm to stiff, very sandy.			
4.15-4.40	SD	4.20	DRY	50/180	Very dense brown clayey fine and medium SAND. [Glacial Sand and Gravel]	4.60-4.75	31.21-31.06	
5.20-5.45	SD	5.20	DRY	50/160	Very stiff brown sandy CLAY with a little fine and medium gravel. [Glacial Till]			
6.20-6.45	SD	5.20	DRY	40		(4.35)		
7.20-7.50	SD	7.00	DRY	42				
8.25-8.50	SD	7.00	DRY	45				
9.10-9.40	SD	9.00	DRY	40	Very stiff dark brown poorly laminated silty CLAY with occasional fine gravel. [Glacial Till]	9.10	26.71	
						(1.75)		
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig Borehole Dia (mm) 150 to 17.15m S to 30.52m Casing Dia (mm) 150 to 17.15m S to 17.00m					Groundwater No. Struck Behaviour Sealed None encountered during drilling.		Ground Level Coordinates 35.81 m OD 113338.2 94754.5 Drilled by KJ HN Logged by SW JW Checked by	
Remarks 1. A little water added throughout to assist drilling. 2. Hard strata/Chiselling: 12.40m to 12.70m (45 mins). See key sheet and appendices for explanations.					Form 1/0			
Borehole Record Exploration Associates					Project M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit		Contract 02200 Borehole 324(1 of 4)	

SJ77SW 277

Sampling					Strata			
Depth / Drill Run	Type / TCW/SCR	Casing (ROD)	Date/ Water	SPT N (Cu)/F1	Description	Depth (Thickness)	Level	Legend
10.10	D		20/04		(See previous sheet - very stiff CLAY).			
10.40-10.85	SD	10.25	DRY	43		10.85	24.96	
11.00	D				Very stiff brown very sandy CLAY with some sub-angular to sub-rounded fine, medium and coarse gravel.			
11.40-11.85	SD	10.20	DRY	48	[Glacial Till]			
12.25	D							
12.60-12.82 12.60-13.00	C B	12.30	DRY	50/ 70		(4.25)		
13.25	D							
13.40 13.45-13.82	U SD	13.00	DRY	50/ 220				
14.30	D							
14.65-15.05	SD	13.00	DRY	50/ 250				
15.10-15.50	B					15.10	20.71	
15.50		15.50	DRY	21/04	Red-brown, mottled grey highly weathered silty MUDSTONE recovered as silty clay with occasional sub-angular mudstone lithorelicts.			
15.75-16.20	SD	15.50	13.40 14.70	51	[Mercia Mudstone WG IV]	(2.05)		
16.75	D							
17.15						17.15	18.66	
18.57	100% (100%)	(70%)		4	Red-brown thinly and thickly laminated silty MUDSTONE with frequent sub-horizontal planar discontinuities and discontinuous gypsum bands. Very weak to weak. [Mercia Mudstone WG IIIa] At 17.53m: open sub-horizontal discontinuity. At 18.34m: open sub-horizontal discontinuity. 18.45m to 18.57m: grey-green in colour. Below 18.57m: becoming red-brown and grey-green thickly interlaminated silty mudstone and clayey siltstone. Weak to very weak. Bands of siltstone up to 35mm thick, frequent sub-horizontal gypsum bands up to 8mm thick. (Mercia Mudstone WG IIIa - II)			
				>20				
				19				
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig					Groundwater No. Struck Behaviour		Sealed Ground Level Coordinates	
Borehole Dia (mm) 150 to 17.15m S to 30.52m		Casing Dia (mm) 150 to 17.15m S to 17.00m		British Geological Survey		35.81 m OD 113338.2 94754.5 mE mN		
Drilled by Logged by Checked by					XP MN SW JW			
Remarks								
See key sheet and appendices for explanations.								
Form 1/0								
Borehole Record				Project			Contract	
British Geological Survey				M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit			D2200	
Exploration Associates				British Geological Survey			Borehole	
							324(2 of 4)	

SJ77SW 277

Sampling					Strata			
Drill Run	TCR (SCR)	Casing (ROD)	Date/ Water	SPT N FI	Description	Depth (Thickness)	Level	Legend
	100% (91%)	(39%)	21/04		(See previous sheet - silty MUDSTONE)			
				19	Below 20.90m: with rare siltstone bands. Weak to moderately weak.			
21.57				9	21.47m to 21.57m: with sub-vertical gypsum filled discontinuity, 8mm wide.			
				NI	Below 21.77m: becoming more weathered.			
					(Mercia Mudstone WG IIIa - II)			
					22.19m to 22.35m: sub-vertical gypsum filled discontinuity, 5mm wide.			
	94% (88%)	(40%)		12	23.39m to 23.52m: sub-vertical gypsum filled discontinuity, 15mm wide.			
				NR	Below 24.07m: with occasional grey-green bands.			
24.52				NR				
				NI	From 24.67m to 25.19m: grey-green in colour, and with bands of clayey siltstone up to 15mm wide.			
				9	25.32m to 25.48m: sub-vertical gypsum filled discontinuity, 6mm wide.			
				NI				
	95% (79%)	(55%)		6	26.08m to 26.16m: sub-vertical gypsum-filled discontinuity.			
				9				
27.52				NI	Below 27.52m: gypsum bands up to 25mm wide, but generally <10mm.			
				>20				
				3	28.72m to 28.94m: sub-vertical gypsum filled discontinuity, 8mm wide.			
				NI				
				4				
	96% (92%)	(39%)		NI				
				>20				
				NI	29.66m to 29.80m: sub-vertical gypsum filled discontinuity, 7mm wide.			
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig					Groundwater No. Struck Behaviour		Sealed	
Borehole Dia (mm) 150 to 17.15m S to 30.52m		Casing Dia (mm) 150 to 17.15m S to 17.00m		British Geological Survey		Ground Level Coordinates 35.81 m OD 113338.2 94754.5 mE mN		
Drilled by Logged by Checked by					British Geological Survey KP MH SW JW			
Remarks See key sheet and appendices for explanations.								
Borehole Record					Project		Contract	
Exploration Associates					M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit		02200	
							Borehole	
							324(3 of 4)	

SJ77 SW 277

Sampling					Strata			
Drill Run	TCR (SCR)	Casing (ROD)	Date/ Water	SPT N Fl	Description	Depth (Thickness)	Level	Legend
			21/04	7	30.17m to 30.42m: sub-vertical gypsum filled discontinuity, 25mm wide.	30.52	5.29	
					End of Borehole.			
Equipment: Cable Percussive Boring Rig Top Drive Rotary Rig Borehole Dia (mm) 150 to 17.15m S to 30.52m Casing Dia (mm) 150 to 17.15m S to 17.00m					Groundwater No. Struck Behaviour Sealed British Geological Survey		Ground Level Coordinates 35.81 m OD 113338.2 94754.5 mE mN Drilled by KP MH Logged by SU JW Checked by	
Remarks See key sheet and appendices for explanations.								
Borehole Record Exploration Associates				Project M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit			Contract 02200 Borehole 324(4 of 4)	

12
34 NE / 31
SJ77 NW/3
No. 83 (contd)
CONFIDENTIAL

	Thickness of strata	Depth from surface	Level reduced to ordnance	71m	01m
Loamy clay	22.5'	31.66'	+ 57.65'		9.64
Fine sandy gravel	5.0'	36.66'	+ 52.65'		11.17
Gravel	6.0'	42.66'	+ 46.65'		13.00
Red Marl	8.0'	50.66'	+ 38.65'		15.44
Hard red & grey marls	144.97'	195.63'	- 106.32'		59.62
Brown & grey marls	10.0'	205.63'	- 116.32'		62.67
Marly ROCK SALT	30.0'	235.63'	- 146.32'		71.8
ROCK SALT	72.0'	307.63'	- 218.32'		93.76
Marly ROCK SALT	2.0'	309.63'	- 220.32'		94.37
Red Marl	6.0'	315.63'	- 226.32'		96.20
Grey Marl	4.0'	319.63'	- 230.32'		97.42
Red Marl	7.0'	326.63'	- 237.32'		99.55
Marly ROCK SALT	28.0'	354.63'	- 265.32'		108.09
Red & grey marl	1.0'	355.63'	- 266.32'		108.39
ROCK SALT	49.0'	404.63'	- 315.32'		123.33
Red marl	6.0'	410.63'	- 321.32'		125.16
Hard grey marl	6.0'	416.63'	- 327.32'		126.98
Red marl	4.5'	421.13'	- 331.82'		128.36
Grey marl	2.5'	423.63'	- 334.32'		129.12
Red marl	9.0'	432.63'	- 343.32'		131.86
ROCK SALT	73.5'	506.13'	- 416.82'		154.26
ROCK SALT with marl	13.5'	519.63'	- 430.32'		158.38
Hard grey marl & ROCKSALT	49.0'	568.63'	- 479.32'		173.31
ROCK SALT & marl	30.0'	598.63'	- 509.32'		182.46

Released from confidential cover
for better than the

CHESHIRE

34 34NE 7

Brine & Water Works
Holford.

6.4

CONFIDENTIAL
SJ77SW

H. 130 STRATA

3 JUNE / 73

[SJ 71347475]

Description of Strata	Thickness	Depth from Surface
Dugwell	10'-0"	10'-0"
Red Clay	7'-0"	17'-0"
Sand and Gravel	8'-0"	25'-0"
Red Clay and Gravel	11'-0"	36'-0"
Red Clay	5'-0"	41'-0" <i>Drift</i>
Red Clay and Gravel	6'-0"	47'-0" ←
Red Marl with Gravel	5'-0"	52'-0"
Red Marl with Gypsum	5'-0"	57'-0"
Red and Grey Marl with Gypsum	4'-6"	61'-6"
Red Marl with Gypsum	5'-0"	66'-6"
Red and Grey Marl with Gypsum	2'-6"	69'-0"
Red Marl with Gypsum	5'-0"	74'-0"
Red and Grey Marl with Gypsum	7'-0"	81'-0"
Red Marl with Gypsum	7'-6"	88'-6"
Red and Grey Marl with Gypsum	7'-0"	95'-6"
Grey Marl with Gypsum	2'-6"	98'-0"
Red Marl with Gypsum	5'-0"	103'-0"
Red and Grey Marl with Gypsum	10'-0"	113'-0"
Red Marl with Gypsum	6'-0"	119'-0"
Red and Grey Marl with Gypsum	7'-0"	126'-0"
Grey Marl with Gypsum	6'-0"	132'-0"
Red and Grey Marl with Gypsum	6'-0"	138'-0"
Grey Marl with Gypsum	12'-0"	150'-0"
Red and Grey Marl with Gypsum	2'-0"	152'-0"
Red Marl with Gypsum	4'-0"	156'-0"
Red and Grey Marl with Gypsum	4'-0"	160'-0"
Core worn away	82'-0"	242'-0"
Grey Marl and Gypsum	5'-6"	247'-6"
Red and Grey Marl with Gypsum	5'-0"	252'-6"
Grey Marl with Gypsum	5'-0"	257'-6"
Red Marl with Gypsum	4'-6"	262'-0"
Red and Grey Marl with Gypsum	2'-6"	264'-6"
Grey Marl with Gypsum	1'-6"	266'-0"
Red Marl with Gypsum	6"	266'-6"
Grey Marl with Gypsum	4'-0"	270'-6"
Red and Grey Marl	1'-6"	272'-0"
Red and Grey Marl with Salt Pockets	2'-0"	274'-0"
Grey Marl	2'-6"	276'-6"
Red and Grey Marl with Gypsum	5'-6"	282'-0"
Red and Grey Marl	3'-0"	285'-0"
R.H. Red and Grey Marl washed away	7'-0"	292'-0"
- Salt Rock with Marl	-2'-0"	294'-0"
- Salt Rock	-24'-0"	318'-0"
Red and Grey Marl	6"	318'-6"
- Salt Rock	-7'-6"	326'-0"
- Salt Rock with Marl	-1'-0"	327'-0"
Red and Grey Marl with Salt Veins	1'-6"	328'-6"
Grey Marl with Salt Veins	#2'-6"	331'-0"
- Salt Rock with Grey Marl	-3'-6"	334'-6"
- Salt Rock	-20'-0"	354'-6"
Red and Grey Marl with Red Salt	1'-6"	356'-0"

Salt Rock

3'-0"

359'-0"

British Geological Survey

British Geological Survey

British Geological Survey

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Description of Strata	Thickness	Depth from Surface
- Salt Rock with Marl	- 5'-0"	364'-0"
- Salt Rock	- 8'-0"	372'-0"
Red Marl	3"	372'-3"
Grey Marl	3"	372'-6"
Salt Rock	- 2'-0"	374'-6"
Salt Rock with Marl	- 4'-0"	378'-6"
Salt Rock	- 64'-0"	442'-6"
Salt Rock with Marl	- 1'-3"	443'-9"
Grey Marl with Red Salt	3"	444'-0"
Red and Grey Marl with Red Salt	2'-0"	446'-0"
Red Marl with Red Salt	5'-0"	451'-0"
Salt Rock	- 1'-0"	452'-0"
Red and Grey Marl	4'-0"	456'-0"
Grey Marl	1'-0"	457'-0"
Red and Grey Marl with Salt Rock	6"	457'-6"
Grey Marl with Red Salt	1'-0"	458'-6"
Red and Grey Marl with Red Salt	1'-0"	459'-6"
Red Marl with Red Salt	5'-3"	464'-9"
Salt Rock	- 5'-6"	470'-3"
Grey Marl	3"	470'-6"
Salt Rock	- 3"	470'-9"
Grey Marl with Red Salt	- 2'-6"	473'-3"
Salt Rock	- 2'-6"	475'-9"
Red and Grey Marl	1'-0"	476'-9"
Red Marl with Red Salt	3'-6"	480'-3"
Salt Rock	- 4'-0"	484'-3"
Marly Rock	- 9"	485'-0"
Grey Marl	3"	485'-3"
Marly Rock	- 6"	485'-9"
Grey Marl with Salt	1'-6"	487'-3"
Salt Rock	- 5'-0"	492'-3"
Red Marl with Salt Veins	6"	492'-9"
Red Salt	- 3"	493'-0"
Red and Grey Marl	1'-0"	494'-0"
Red Marl with Red Salt	2'-0"	496'-0"
Marly Rock	- 1'-0"	497'-0"
Salt Rock	- 39'-0"	536'-0"
Salt Rock with Grey Marl	- 1'-0"	537'-0"
Salt Rock	- 7'-0"	544'-0"
Grey Marl with Salt Veins	1'-0"	545'-0"
Grey Marl	1'-6"	546'-6"
Red Marl	6'-0"	552'-6"
Red and Grey Marl	5'-0"	557'-6"
Grey Marl	2'-6"	560'-0"
Marly Rock	- 1'-6"	561'-6"
Grey Marl	2'-0"	563'-6"
Red Marl with Red Salt	4'-6"	568'-0"
Red and Grey Marl	5'-0"	573'-0"
Grey Marl with Red Salt	1'-6"	574'-6"
Red and Grey Marl with Red Salt	6"	575'-0"
Salt Rock with Marl	- 5'-0"	580'-0"
Salt Rock	- 78'-0"	658'-0"
Grey Marl	6"	658'-6"
Red Marl with Red Salt	5'-3"	663'-9"
Red and Grey Marl with Salt	9"	664'-6"

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Description of Strata	Thickness	Depth from Surface
Salt Rock with Grey Marl	- 1'-3"	675'-0"
Red and Grey Marl with Red Salt	2'-0"	677'-0"
Marly Rock	- 23'-0"	700'-0"
Salt Rock	- 11'-6"	711'-6"
Grey Marl with Salt Veins	1'-6"	713'-0"
Salt Rock	- 1'-0"	714'-0"
Marly Rock	- 4'-0"	718'-0"
Salt Rock	- 11'-0"	729'-0"
Marly Rock	- 6'-6"	735'-6"
Red Marl with Salt Pockets	3"	735'-9"
Salt Rock	- 1'-0"	736'-9"
Red and Grey Marl with Salt	6"	737'-3"
Salt Rock	- 12'-3"	749'-6"
Marly Rock	- 5'-0"	754'-6"
Salt Rock	- 94'-0"	848'-6"
Marly Rock	- 4'-9"	853'-3"
Red Marl with Salt Pockets	9"	854'-0"
Red and Grey Marl with Salt Pockets	7'-0"	861'-0"
Grey Marl with Red Salt	1'-0"	862'-0"
Red and Grey Marl	3"	862'-3"
Grey Marl with Red Salt	1'-0"	863'-3"
Red and Grey Marl with Red Salt	1'-0"	864'-3"
Red Marl with Red Salt	6'-0"	870'-3"
Red and Grey Marl with Salt Pockets	5'-6"	875'-9"
Salt Rock with Grey Marl	- 3'-3"	879'-0"
Red Marl	3'-6"	882'-6"
Salt Rock	- 14'-6"	897'-0"
Marly Rock	- 9'-0"	906'-0"
Salt Rock	- 72'-6"	978'-6"
Grey Marl with Salt Rock	1'-0"	979'-6"
Red Marl with Red Salt	4'-6"	984'-0"
Marly Rock	- 2'-0"	986'-0"
Salt Rock	- 1'-0"	987'-0"
Red and Grey Marl with Salt	4'-6"	991'-6"
Salt Rock	- 2'-0"	993'-6"
Grey Marl with Salt Rock	1'-0"	994'-6"
Salt Rock	- 3'-0"	997'-6"
Red and Grey Marl with Salt	1'-0"	998'-6"
Red and Grey Marl	1'-6"	1000'-0"
Grey Marl	1'-6"	1001'-6"
Red and Grey Marl	2'-0"	1003'-6"
Red Marl with Red Salt	2'-0"	1005'-6"
Red and Grey Marl with Red Salt	3'-0"	1008'-6"
Red Marl	3'-0"	1011'-6"
Red and Grey Marl with Salt	1'-0"	1012'-6"
Marly Rock	- 4'-0"	1016'-6"
Salt Rock	- 3'-0"	1019'-6"
Red and Grey Marl	2'-6"	1022'-0"
Red Marl with Salt Veins	5'-6"	1027'-6"
Marly Rock	- 3'-0"	1030'-6"
Salt Rock	- 11'-0"	1041'-6"
Red and Grey Marl with Red Salt	5'-0"	1046'-6"
Marly Rock	- 1'-0"	1047'-6"
Red and Grey Marl with Salt	5'-6"	1053'-0"

30'
Halt



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Description of Strata	Thickness	Depth from Surface
Red and Grey Marl	11'-0"	1076'-0"
Red Marl	3'-6"	1079'-6"
Red and Grey Marl	2'-6"	1082'-0"


1047
 292

 755

Sampling				Strata				
Depth	Type	Casing Depth	Date/ Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend
0.20	D		29/03 1993		Turf and Topsoil. (Topsoil)	G.L.	39.42	
0.20-0.45	B				MADE GROUND: Dark grey sandy clay with much brick and masonry fragments. [Made Ground]	0.20	39.22	
0.45	D					0.45	38.97	
0.50-0.95	B							
0.50-0.95	C							
1.40	D				Firm becoming stiff grey-brown fissured sandy CLAY with a little gravel and grey silt on fissures.			
1.50-1.95	SD	1.00	DRY	6	[Glacial Till]			
1.50-1.95	B							
2.40	D					(3.65)		
2.55-3.00	SD	2.00	DRY	6	Below 2.40m: occasionally poorly laminated.			
2.55-3.00	B							
3.40	D							
3.50-3.95	SD	3.00	DRY	7				
3.50-3.95	B							
4.10	D					4.10	35.32	
4.25-4.70	SD	4.00	DRY	16	Firm to stiff dark brown sandy CLAY with a little fine and medium gravel.			
4.25-4.70	B				[Glacial Till]			
5.05	B							
5.15-5.60	SD	5.00	DRY	14				
5.15-5.60	B							
6.00	D					(3.60)		
6.15-6.60	SD	6.00	DRY	15				
6.15-6.60	B							
7.10	D							
7.15-7.60	SD	7.00	DRY	15				
7.15-7.60	B							
7.70	D					7.70	31.72	
7.90-8.35	SD	7.50	DRY	11	Stiff dark brown thinly laminated slightly sandy very silty CLAY.			
7.90-8.35	B				[Glacial Laminated Clay]			
8.00	W					(1.60)		
8.75	D							
8.85	SD	8.90	8.50	22	At 8.85m: with lenses of sand and gravel.			
9.00-9.45	SD				At 9.00m: with thin bands of clayey silt.			
9.00-9.45	B							
9.80	D					9.30	30.12	
9.95-10.40	SD	9.60	9.00	27	Stiff dark brown sandy very silty CLAY with traces of gravel.			
9.95-10.40	B				[Glacial Till]			
Equipment: Cable Percussive Boring Rig				Groundwater		Sealed		Ground Level Coordinates
Borehole Dia (mm) 150 to 26.10m				Casing Dia (mm) 150 to 22.50m		No. Struck Behaviour		39.421 m OD
						1 8.00 Rose to 7.50m in 20 minutes.		113228.0 mE
						2 15.10		93168.5 mN
						22.50		Drilled by BH
								Logged by JW
								Checked by
Remarks 1. Hard strata/Chiselling: 17.00m to 17.70m (2 hours).								
See key sheet and appendices for explanations.								
Borehole Record				Project		Contract		
Exploration Associates				M6 Widening Junctions 15 to 20 Department of Transport Motorway Widening Unit		D2200		
						Borehole		
						304 (1 of 3)		

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Sampling					Strata			
Depth	Type	Casing Depth	Date/Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend
9.95-10.40	B		29/03		(See previous sheet - sandy CLAY)			
10.90 11.00-11.45 11.00-11.45	D SD B	11.00	10.30	34				
11.90 12.05-12.50 12.05-12.50	D SD B	12.00	10.00	40		(5.80)		
12.90 13.10-13.45 13.10-13.60	D C B	13.00	12.00	78/ 150				
14.00 14.20-14.65 14.20-14.65	D C B	14.00	12.50	48				
14.65 14.90 15.00-15.45 15.00-15.45 15.10	D SD B U	14.50 14.50	12.00 30/03 10.20 13.00	18	Medium dense brown fine and medium SAND. [Glacial Sand and Gravel]	15.10 15.35	24.32 24.07	
15.90 16.00-16.45 16.00-16.45	D C B	15.90	14.00	13	Firm to stiff dark brown very sandy CLAY with traces of gravel. [Glacial Till]	(1.15)		
16.50 16.60-17.05 16.60-17.05	D SD B	16.50	13.80	25	Firm to stiff brown thinly laminated very silty CLAY. Silt on laminae. [Glacial laminated clay]	16.50 (0.40)	22.92	
17.05-17.15 17.05-17.60	C B	17.00	15.00	78*/ 100	Stiff dark brown very sandy CLAY with some fine to coarse gravel. [Glacial Till]	16.90	22.52	
17.70 17.80-18.25 17.80-18.25	D C B	17.50	16.00	30	From 16.90m to 17.60m: with frequent cobbles and small boulders.			
18.65 18.75-19.20 18.75-19.20	D C B	18.50	16.00	36				
19.70 19.80-20.25 19.80-20.20	D C B	19.60	17.40	39				
Equipment: Cable Percussive Boring Rig					Groundwater No. Struck Behaviour		Sealed	Ground Level Coordinates 39.421 m OD 113228.0 93168.5 mE mN
Borehole Dia (mm) 150 to 26.10m		Casing Dia (mm) 150 to 22.50m		Borehole				
Remarks					Project		Contract	
See key sheet and appendices for explanations.					M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit		02200	
Exploration Associates					Borehole		304(2 of 3)	

Sampling					Strata			
Depth	Type	Casing Depth	Date/Water	SPT N (Cu)	Description	Depth (Thickness)	Level	Legend
			30/03		(See previous sheet - sandy CLAY)			
20.70 20.85-21.30 20.85-21.30	D C B	20.50	18.00	49	Below 21.00m: becoming very stiff.	(7.70)		
21.60 21.75-22.20 21.75-22.20	D C B	21.50	20.00	89				
22.60 22.75-23.20 22.75-23.20	D C B	22.50	DRY	60				
23.65 23.80-24.25 23.80-24.25	D C B	22.50	DRY	49				
24.55 24.60 24.75-25.20	D D SD	22.50	DRY	76	Red-brown thinly and thickly laminated silty MUDSTONE with frequent sub-horizontal discontinuous gypsum bands. (Mercia Mudstone WG IV)	24.60	14.82	
25.60 25.65-26.10 25.65-26.10	D SD D	22.50	DRY	76				
26.10			22.50	26.10	End of Borehole.	26.10	13.32	
Equipment: Cable Percussive Boring Rig Borehole Dia (mm) 150 to 26.10m Casing Dia (mm) 150 to 22.50m					Groundwater No. Struck Behaviour Sealed		Ground Level Coordinates 39,421 m 00 113228,0 mE 93168,5 mN	
Remarks See key sheet and appendices for explanations.					Form 1/0			
Borehole Record  Exploration Associates			Project M6 Widening Junctions 16 to 20 Department of Transport Motorway Widening Unit			Contract D2200 Borehole 304 (3 of 3)		

Appendix E

Baseline Soil and Groundwater Quality Dataset for Plumley PSD

J E Sample No.	1	22-24	31-33	36-38	GSC
Sample ID	BH-4 (S)	BH-1	BH-3	BH-2(S)	
Depth	1.0-1.2	0.2-0.4	0.0-0.2	0.-0.4	
Sample Date	11/03/2014	13/03/2014	13/03/2014	14/03/2014	
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014	
mg/l					
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	
Dissolved Boron #	0.020	<0.012	<0.012	<0.012	0.5
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	
Dissolved Mercury #	<0.001	<0.001	<0.001	<0.001	
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	
mg/l					
Naphthalene	0.00426	0.00135	0.00014	0.00007	0.0012
Acenaphthylene	<0.000013	<0.000013	<0.000013	<0.000013	
Acenaphthene	<0.000013	<0.000013	0.00002	<0.000013	
Fluorene	<0.000014	<0.000014	0.00002	<0.000014	
Phenanthrene	<0.000011	<0.000011	0.00002	0.00003	
Anthracene	<0.000013	<0.000013	<0.000013	<0.000013	
Fluoranthene	<0.000012	<0.000012	<0.000012	<0.000012	0.0001
Pyrene	<0.000013	<0.000013	<0.000013	<0.000013	
Benzo(a)anthracene	<0.000015	<0.000015	<0.000015	<0.000015	
Chrysene	<0.000011	<0.000011	<0.000011	<0.000011	
Benzo(bk)fluoranthene	<0.000018	<0.000018	<0.000018	<0.000018	
Benzo(a)pyrene	<0.000016	<0.000016	<0.000016	<0.000016	
Indeno(123cd)pyrene	<0.000011	<0.000011	<0.000011	<0.000011	
Dibenzo(ah)anthracene	<0.00001	<0.00001	<0.00001	<0.00001	
Benzo(ghi)perylene	<0.000011	<0.000011	<0.000011	<0.000011	
PAH 16 Total	0.00426	0.00135	0.0002	<0.000195	
Benzo(b)fluoranthene	<0.00001	<0.00001	<0.00001	<0.00001	
Benzo(k)fluoranthene	<0.00001	<0.00001	<0.00001	<0.00001	
PAH Surrogate % Recovery					
ug/l					
EPH >C8-C10	<10	<10	<10	<10	
EPH >C10-C12	<10	<10	<10	<10	
EPH >C12-C16	<10	<10	<10	<10	
EPH >C16-C21	<10	<10	<10	<10	
EPH >C21-C35	<10	<10	<10	<10	
EPH >C8-C35	<10	<10	<10	<10	
mg/l					
Phenol	<0.01	<0.01	<0.01	<0.01	
mg/l					
Sulphate #	47.9	<0.05	0.38	27.13	250
mg/l					
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	
mg/l					
Dissolved Organic Carbon	3	7	5	2	
pH	8.99	8.19	7.66	7.94	

Sample ID	Depth	Asbestos Containing Material	Asbestos Results
BH-4 (S)	0.5	None	NAD
TP-11	0.0-0.3	None	NAD
TP-10	0.0-0.3	None	NAD
TP-3	0.0-0.2	None	NAD
TP-8	0.0-0.3	None	NAD
TP-4	0.0-0.2	None	NAD
TP-7	0.0-0.3	None	NAD
TP-9	0.0-0.3	None	NAD
BH-1	0.2-0.4	None	NAD
TP-6	0.1-0.4	None	NAD
TP-5	0.2-0.4	None	NAD
TP-5	0.0-0.2	None	NAD
BH-3	0.0-0.2	None	NAD
BH-2(S)	0.-0.4	None	NAD

Non sensitive GW		GSAC			
J E Sample No.		1-6	7-12	1-6	7-12
Sample ID		BH-2(S)	BH-4(S)	BH-2(S)	BH-4(S)
Sample Date		20/03/2014	20/03/2014	28/03/2014	28/03/2014
	ug/l				
Dissolved Arsenic #	10	<2.5	12.1	<2.5	<2.5
Dissolved Boron	500	757	118	544	93
Dissolved Cadmium #		<0.5	<0.5	<0.5	<0.5
Total Dissolved Chromium #		<1.5	<1.5	<1.5	<1.5
Dissolved Copper #		<7	<7	<7	<7
Dissolved Lead #		<5	<5	<5	<5
Dissolved Mercury #		<1	<1	<1	<1
Dissolved Nickel #		<2	<2	3	5
Dissolved Selenium #		<3	<3	<3	<3
Dissolved Zinc #	40	<3	3	<3	<3
Total Hardness Dissolved (as CaCO3)				403	597
	ug/l				
Naphthalene #	1.2	0.39	0.21	1.53	2.66
Acenaphthylene #		0.05	<0.013	0.06	0.11
Acenaphthene #		0.03	<0.013	0.02	0.04
Fluorene #		0.02	0.03	<0.014	0.03
Phenanthrene #		0.04	0.16	0.02	0.03
Anthracene #	0.1	<0.013	<0.013	<0.013	<0.013
Fluoranthene #	0.1	0.02	0.12	<0.012	<0.012
Pyrene #		0.02	0.09	<0.013	<0.013
Benzo(a)anthracene #		<0.015	0.02	<0.015	<0.015
Chrysene #		<0.011	0.04	<0.011	<0.011
Benzo(bk)fluoranthene #		<0.018	0.03	<0.018	<0.018
Benzo(a)pyrene #		<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene #		<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene #		<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene #		<0.011	<0.011	<0.011	<0.011
PAH 16 Total #		0.57	0.7	1.63	2.87
Benzo(b)fluoranthene		<0.01	0.02	<0.01	<0.01
Benzo(k)fluoranthene		<0.01	<0.01	<0.01	<0.01
PAH Surrogate % Recovery		84	83	90	88
	ug/l				
EPH (C8-C40) #		<10	<10	<10	<10
	mg/l				
Phenol #		<0.01	<0.01	<0.01	<0.01
	mg/l				
Sulphate #	250	55.7	21.4	87.5	50.75
	mg/l				
Total Cyanide #		<0.01	<0.01	<0.01	<0.01
pH #		7.53	7.51	7.01	7.5
Total Organic Carbon #		112	<2	71	6

J E Sample No.	1	22-24	31-33	36-38	GSS
Sample ID	BH-4 (S)	BH-1	BH-3	BH-2(S)	mg/l
Depth	1.0-1.2	0.2-0.4	0.0-0.2	0.-0.4	
Sample Date	11/03/2014	13/03/2014	13/03/2014	14/03/2014	
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014	
mg/l					
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	LoD
Dissolved Boron #	0.020	<0.012	<0.012	<0.012	0.5
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	LoD
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	LoD
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	LoD
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	LoD
Dissolved Mercury #	<0.001	<0.001	<0.001	<0.001	LoD
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	LoD
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	LoD
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	LoD
mg/l					
Naphthalene	0.00426	0.00135	0.00014	0.00007	0.0012
Acenaphthylene	<0.000013	<0.000013	<0.000013	<0.000013	LoD
Acenaphthene	<0.000013	<0.000013	0.00002	<0.000013	LoD
Fluorene	<0.000014	<0.000014	0.00002	<0.000014	LoD
Phenanthrene	<0.000011	<0.000011	0.00002	0.00003	N/A
Anthracene	<0.000013	<0.000013	<0.000013	<0.000013	LoD
Fluoranthene	<0.000012	<0.000012	<0.000012	<0.000012	0.0001
Pyrene	<0.000013	<0.000013	<0.000013	<0.000013	LoD
Benzo(a)anthracene	<0.000015	<0.000015	<0.000015	<0.000015	LoD
Chrysene	<0.000011	<0.000011	<0.000011	<0.000011	LoD
Benzo(bk)fluoranthene	<0.000018	<0.000018	<0.000018	<0.000018	LoD
Benzo(a)pyrene	<0.000016	<0.000016	<0.000016	<0.000016	LoD
Indeno(123cd)pyrene	<0.000011	<0.000011	<0.000011	<0.000011	LoD
Dibenzo(ah)anthracene	<0.00001	<0.00001	<0.00001	<0.00001	LoD
Benzo(ghi)perylene	<0.000011	<0.000011	<0.000011	<0.000011	LoD
PAH 16 Total	0.00426	0.00135	0.0002	<0.000195	
Benzo(b)fluoranthene	<0.00001	<0.00001	<0.00001	<0.00001	LoD
Benzo(k)fluoranthene	<0.00001	<0.00001	<0.00001	<0.00001	LoD
PAH Surrogate % Recovery					
ug/l					
EPH >C8-C10	<10	<10	<10	<10	LoD
EPH >C10-C12	<10	<10	<10	<10	LoD
EPH >C12-C16	<10	<10	<10	<10	LoD
EPH >C16-C21	<10	<10	<10	<10	LoD
EPH >C21-C35	<10	<10	<10	<10	LoD
EPH >C8-C35	<10	<10	<10	<10	LoD
mg/l					
Phenol	<0.01	<0.01	<0.01	<0.01	
mg/l					
Sulphate #	47.9	<0.05	0.38	27.13	250
mg/l					
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	LoD
mg/l					
Dissolved Organic Carbon	3	7	5	2	
pH	8.99	8.19	7.66	7.94	

Groundwater		GSS			
J E Sample No.		1-6	7-12	1-6	7-12
Sample ID		BH-2(S)	BH-4(S)	BH-2(S)	BH-4(S)
Sample Date		20/03/2014	20/03/2014	28/03/2014	28/03/2014
ug/l		ug/l			
Dissolved Arsenic #	10	<2.5	12.1	<2.5	<2.5
Dissolved Boron	500	757	118	544	93
Dissolved Cadmium #		<0.5	<0.5	<0.5	<0.5
Total Dissolved Chromium #		<1.5	<1.5	<1.5	<1.5
Dissolved Copper #		<7	<7	<7	<7
Dissolved Lead #		<5	<5	<5	<5
Dissolved Mercury #		<1	<1	<1	<1
Dissolved Nickel #		<2	<2	3	5
Dissolved Selenium #		<3	<3	<3	<3
Dissolved Zinc #		<3	3	<3	<3
Total Hardness Dissolved (as CaCO3)				403	597
ug/l		ug/l			
Naphthalene #	1.2	0.39	0.21	1.53	2.66
Acenaphthylene #		0.05	<0.013	0.06	0.11
Acenaphthene #		0.03	<0.013	0.02	0.04
Fluorene #		0.02	0.03	<0.014	0.03
Phenanthrene #		0.04	0.16	0.02	0.03
Anthracene #		<0.013	<0.013	<0.013	<0.013
Fluoranthene #	0.1	0.02	0.12	<0.012	<0.012
Pyrene #		0.02	0.09	<0.013	<0.013
Benzo(a)anthracene #		<0.015	0.02	<0.015	<0.015
Chrysene #		<0.011	0.04	<0.011	<0.011
Benzo(bk)fluoranthene #		<0.018	0.03	<0.018	<0.018
Benzo(a)pyrene #		<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene #		<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene #		<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene #		<0.011	<0.011	<0.011	<0.011
PAH 16 Total #		0.57	0.7	1.63	2.87
Benzo(b)fluoranthene		<0.01	0.02	<0.01	<0.01
Benzo(k)fluoranthene		<0.01	<0.01	<0.01	<0.01
PAH Surrogate % Recovery		84	83	90	88
ug/l		ug/l			
EPH (C8-C40) #		<10	<10	<10	<10
mg/l		mg/l			
Phenol #		<0.01	<0.01	<0.01	<0.01
mg/l		mg/l			
Sulphate #	250	55.7	21.4	87.5	50.75
mg/l		mg/l			
Total Cyanide #		<0.01	<0.01	<0.01	<0.01
pH #		7.53	7.51	7.01	7.5
Total Organic Carbon #		112	<2	71	6



Certificate of Analysis

Certificate Number 14-03256

15-Apr-14

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 14-03256

Client Reference PSL14/1640

Contract Title Plumley, Cheshire

Description 17 Soil samples.

Date Received 07-Apr-14

Date Started 07-Apr-14

Date Completed 15-Apr-14

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "Rob Brown".

Rob Brown
Business Manager



Summary of Chemical Analysis Soil Samples

Our Ref 14-03256

Client Ref PSL14/1640

Contract Title Plumley, Cheshire

Lab No	631405	631406	631407	631408	631409	631410	631411	631412	631413	631414	631415
Sample ID	BH-2(S)	BH-2(S)	BH-2(S)	BH-2(S)	BH-3	BH-3	BH-3	BH-4(S)	BH-4(S)	BH-1	TP-3
Depth	0.90-1.20	2.00-3.00	4.00-5.00	6.50-7.00	0.50-0.70	1.20-2.00	3.00-4.00	0.00-0.50	1.00-2.00	0.50-0.90	0.20-0.50
Other ID							100				
Sample Type	B	B	B	B	B	B	U	B	B	B	B
Sampling Date	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units											
Metals														
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	11	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Inorganics														
pH	DETSC 2008#			8.6	8.8	8.8	9.0	8.6	8.8	9.0	8.1	8.7	8.5	7.9
Chloride Aqueous Extract	DETSC 2055	1	mg/l	7.8	6.8	260	14	8.0	11	5.1	13	2000	24	35
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	< 1.0	7.5	< 1.0	< 1.0	1.5	2.1	6.3	1.1	< 1.0	90
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	52	27	45	48	19	41	39	13	240	20	63

Summary of Chemical Analysis

Soil Samples

Our Ref 14-03256
 Client Ref PSL14/1640
 Contract Title Plumley, Cheshire

Lab No	631416	631417	631418	631419	631420	631421
Sample ID	TP-4	TP-5	TP-6	TP-7	TP-8	TP-9
Depth	0.40-0.60	0.20-0.60	0.70-0.90	0.90-1.20	0.30-0.50	0.30-0.60
Other ID						
Sample Type	B	B	B	B	B	B
Sampling Date	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14	01/04/14
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10	< 10	< 10	< 10
Inorganics									
pH	DETSC 2008#			7.0	8.5	8.6	8.6	6.7	7.3
Chloride Aqueous Extract	DETSC 2055	1	mg/l	4.5	8.0	29	7.9	8.4	5.5
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	2.1	4.3	< 1.0	< 1.0	< 1.0	6.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	13	53	27	25	20	18

Information in Support of the Analytical Results

Our Ref 14-03256
Client Ref PSL14/1640
Contract Plumley, Cheshire

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
631405	BH-2(S) 0.90-1.20 SOIL	01/04/14	PT 1L (1kg)		
631406	BH-2(S) 2.00-3.00 SOIL	01/04/14	PT 1L (1kg)		
631407	BH-2(S) 4.00-5.00 SOIL	01/04/14	PT 1L (1kg)		
631408	BH-2(S) 6.50-7.00 SOIL	01/04/14	PT 1L (1kg)		
631409	BH-3 0.50-0.70 SOIL	01/04/14	PT 1L (1kg)		
631410	BH-3 1.20-2.00 SOIL	01/04/14	PT 1L (1kg)		
631411	BH-3 3.00-4.00 SOIL	01/04/14	PT 1L (1kg)		
631412	BH-4(S) 0.00-0.50 SOIL	01/04/14	PT 1L (1kg)		
631413	BH-4(S) 1.00-2.00 SOIL	01/04/14	PT 1L (1kg)		
631414	BH-1 0.50-0.90 SOIL	01/04/14	PT 1L (1kg)		
631415	TP-3 0.20-0.50 SOIL	01/04/14	PT 1L (1kg)		
631416	TP-4 0.40-0.60 SOIL	01/04/14	PT 1L (1kg)		
631417	TP-5 0.20-0.60 SOIL	01/04/14	PT 1L (1kg)		
631418	TP-6 0.70-0.90 SOIL	01/04/14	PT 1L (1kg)		
631419	TP-7 0.90-1.20 SOIL	01/04/14	PT 1L (1kg)		
631420	TP-8 0.30-0.50 SOIL	01/04/14	PT 1L (1kg)		
631421	TP-9 0.30-0.60 SOIL	01/04/14	PT 1L (1kg)		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Worley Parsons
11a Alma Road
Headingley
Leeds
LS6 2AH

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



Attention : Paul Ryman
Date : 1st April, 2014
Your reference : Project Lindis
Our reference : Test Report 14/3960 Batch 1
Location : Plumley Cheshire
Date samples received : 18th March, 2014
Status : Final report
Issue : 1

Eighteen samples were received for analysis on 18th March, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Kim Mills
Project Co-ordinator

Bob Millward BSc FRSC
Principal Chemist

Jones Environmental Laboratory

Client Name: Worley Parsons
Reference: Poject Lindis
Location: Plumley Cheshire
Contact: Paul Ryman
JE Job No.: 14/3960

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-17	18-19	20-21	Please see attached notes for all abbreviations and acronyms		
Sample ID	BH-4 (S)	BH-4 (S)	TP-11	TP-10	TP-10	TP-3	TP-8	TP-4	TP-7	TP-9			
Depth	0.5	0.75-1.0	0.0-0.3	1.2-1.4	0.0-0.3	0.0-0.2	0.0-0.3	0.0-0.2	0.0-0.3	0.0-0.3			
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J	V J	V J	V J	V J			
Sample Date	11/03/2014	11/03/2014	12/03/2014	12/03/2014	12/03/2014	12/03/2014	12/03/2014	12/03/2014	13/03/2014	13/03/2014			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	LOD/LOR	Units	Method No.
Arsenic #	7.7	7.4	6.4	7.2	8.1	8.4	9.7	8.8	5.0	8.0	<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.1	<0.1	0.2	<0.1	mg/kg	TM30/PM15
Chromium #	35.8	35.4	37.1	21.9	45.4	41.5	36.5	21.0	65.0	60.3	<0.5	mg/kg	TM30/PM15
Copper #	17	21	13	14	11	17	14	13	11	15	<1	mg/kg	TM30/PM15
Lead #	9	8	7	6	10	21	35	30	17	27	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Nickel #	29.2	36.0	29.2	24.0	29.2	24.8	13.5	12.7	14.6	15.0	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.5	3.9	0.9	0.5	0.6	1.1	0.7	0.9	1.1	1.1	<0.1	mg/kg	TM74/PM32
Zinc #	45	62	36	41	43	53	54	49	31	53	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	0.05	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	0.15	0.06	<0.03	0.04	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.14	0.06	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.08	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.10	0.06	<0.02	0.04	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.11	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	0.09	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.10	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	0.05	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	90	83	89	82	80	81	107	107	106	<0	%	TM4/PM8
EPH >C8-C10 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	mg/kg	TM5/PM8
EPH >C10-C12 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8
EPH >C12-C16 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8
EPH >C16-C21 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8
EPH >C21-C35 #	<10	<10	<10	<10	<10	<10	32	30	<10	20	<10	mg/kg	TM5/PM8
EPH >C8-C35 #	<30	<30	<30	<30	<30	<30	32	30	<30	<30	<30	mg/kg	TM5/PM8
Phenol #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM26/PM21
Natural Moisture Content	17.1	22.8	15.7	11.3	21.9	18.3	24.1	21.3	21.8	27.2	<0.1	%	PM4/PM0
Sulphate as SO4 (2:1 Ext) #	0.0602	0.1710	0.0092	0.0271	0.0743	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	g/l	TM38/PM20

Please include all sections of this report if it is reproduced

Client Name: Worley Parsons
Reference: Project Lindis
Location: Plumley Cheshire
Contact: Paul Ryman
JE Job No.: 14/3960

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-17	18-19	20-21	Please see attached notes for all abbreviations and acronyms		
Sample ID	BH-4 (S)	BH-4 (S)	TP-11	TP-10	TP-10	TP-3	TP-8	TP-4	TP-7	TP-9			
Depth	0.5	0.75-1.0	0.0-0.3	1.2-1.4	0.0-0.3	0.0-0.2	0.0-0.3	0.0-0.2	0.0-0.3	0.0-0.3			
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J	V J	V J	V J	V J			
Sample Date	11/03/2014	11/03/2014	12/03/2014	12/03/2014	12/03/2014	12/03/2014	12/03/2014	12/03/2014	13/03/2014	13/03/2014			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014			
Total Cyanide #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Organic Matter	0.5	0.9	0.3	<0.2	0.9	1.6	2.2	1.9	1.4	2.4	<0.2	%	TM21/PM24
pH #	9.00	8.08	7.73	8.95	8.00	8.52	6.94	6.72	7.91	6.65	<0.01	pH units	TM73/PM11

Jones Environmental Laboratory

Client Name: Worley Parsons
Reference: Project Lindis
Location: Plumley Cheshire
Contact: Paul Ryman
JE Job No.: 14/3960

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	22-24	25-26	27-28	29-30	31-33	34-35	36-38							
Sample ID	BH-1	TP-6	TP-5	TP-5	BH-3(S)	BH-3(S)	BH-3(S)							
Depth	0.2-0.4	0.1-0.4	0.2-0.4	0.0-0.2	0.0-0.2	0.9-1.2	0.-0.4							
COC No / misc														
Containers	V J T	V J	V J	V J	V J T	V J	V J T							
Sample Date	13/03/2014	13/03/2014	13/03/2014	13/03/2014	13/03/2014	14/03/2014	14/03/2014							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1	1							
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014							
								LOD/LOR	Units	Method No.	Please see attached notes for all abbreviations and acronyms			
Arsenic #	7.3	6.7	6.9	31.4	7.9	6.3	6.9	<0.5	mg/kg	TM30/PM15				
Cadmium #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15				
Chromium #	53.9	44.0	41.5	90.2	43.6	21.6	36.7	<0.5	mg/kg	TM30/PM15				
Copper #	17	19	12	248	19	15	11	<1	mg/kg	TM30/PM15				
Lead #	13	16	20	139	11	5	11	<5	mg/kg	TM30/PM15				
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15				
Nickel #	24.5	24.7	12.0	119.6	44.1	22.8	28.5	<0.7	mg/kg	TM30/PM15				
Selenium #	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM30/PM15				
Water Soluble Boron #	1.1	0.6	0.8	1.8	1.2	0.4	1.3	<0.1	mg/kg	TM74/PM32				
Zinc #	49	46	38	200	51	40	45	<5	mg/kg	TM30/PM15				
PAH MS														
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8				
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8				
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8				
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8				
Phenanthrene #	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8				
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8				
Fluoranthene #	<0.03	0.07	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8				
Pyrene #	<0.03	0.06	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8				
Benzo(a)anthracene #	<0.06	0.07	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8				
Chrysene #	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8				
Benzo(b)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8				
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8				
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8				
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8				
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8				
PAH 16 Total	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	mg/kg	TM4/PM8				
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8				
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8				
PAH Surrogate % Recovery	108	107	108	102	106	106	102	<0	%	TM4/PM8				
EPH >C8-C10 #	<5	<5	<5	<5	<5	<5	<5	<5	mg/kg	TM5/PM8				
EPH >C10-C12 #	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8				
EPH >C12-C16 #	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8				
EPH >C16-C21 #	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8				
EPH >C21-C35 #	85	55	<10	219	<10	<10	<10	<10	mg/kg	TM5/PM8				
EPH >C8-C35 #	85	55	<30	219	<30	<30	<30	<30	mg/kg	TM5/PM8				
Phenol #	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.01	mg/kg	TM26/PM21				
Natural Moisture Content	19.2	17.4	17.9	38.1	22.0	10.9	21.0	<0.1	%	PM4/PM0				
Sulphate as SO4 (2:1 Ext) #	<0.0015	0.0061	0.0324	0.1274	0.0244	0.0367	0.0455	<0.0015	g/l	TM38/PM20				

Jones Environmental Laboratory

Client Name: Worley Parsons
 Reference: Poject Lindis
 Location: Plumley Cheshire
 Contact: Paul Ryman
 JE Job No.: 14/3960

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	22-24	25-26	27-28	29-30	31-33	34-35	36-38								
Sample ID	BH-1	TP-6	TP-5	TP-5	BH-3(S)	BH-3(S)	BH-3(S)								
Depth	0.2-0.4	0.1-0.4	0.2-0.4	0.0-0.2	0.0-0.2	0.9-1.2	0.0-0.4								
COC No / misc															
Containers	V J T	V J	V J	V J	V J T	V J	V J T								
Sample Date	13/03/2014	13/03/2014	13/03/2014	13/03/2014	13/03/2014	14/03/2014	14/03/2014								
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1	1	1								
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014	18/03/2014								
									LOD/LOR	Units	Method No.				
Total Cyanide #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	mg/kg	TM89/PM45	
Organic Matter	2.2	2.4	2.1	31.4	0.9	<0.2	1.0					<0.2	%	TM21/PM24	
pH #	8.21	7.78	7.92	7.24	7.67	8.69	7.50					<0.01	pH units	TM73/PM11	

Client Name: Worley Parsons
 Reference: Project Lindis
 Location: Plumley Cheshire
 Contact: Paul Ryman
 JE Job No.: 14/3960

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	22-24	31-33	36-38				Please see attached notes for all abbreviations and acronyms		
	Sample ID	BH-4 (S)	BH-1	BH-3(S)	BH-3(S)					
Depth	1.0-1.2	0.2-0.4	0.0-0.2	0.0-0.4						
COC No / misc										
Containers	T	V J T	V J T	V J T						
Sample Date	11/03/2014	13/03/2014	13/03/2014	14/03/2014						
Sample Type	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1						
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014	LOD/LOR	Units	Method No.			
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17			
Dissolved Boron #	0.020	<0.012	<0.012	<0.012	<0.012	mg/l	TM30/PM17			
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17			
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17			
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17			
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17			
Dissolved Mercury #	<0.001	<0.001	<0.001	<0.001	<0.001	mg/l	TM30/PM17			
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17			
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17			
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17			
PAH MS										
Naphthalene	0.004260	0.001350	0.000140	0.000070	<0.000014	mg/l	TM4/PM30			
Acenaphthylene	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013	mg/l	TM4/PM30			
Acenaphthene	<0.000013	<0.000013	0.000020	<0.000013	<0.000013	mg/l	TM4/PM30			
Fluorene	<0.000014	<0.000014	0.000020	<0.000014	<0.000014	mg/l	TM4/PM30			
Phenanthrene	<0.000011	<0.000011	0.000020	0.000030	<0.000011	mg/l	TM4/PM30			
Anthracene	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013	mg/l	TM4/PM30			
Fluoranthene	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012	mg/l	TM4/PM30			
Pyrene	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013	mg/l	TM4/PM30			
Benzo(a)anthracene	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	mg/l	TM4/PM30			
Chrysene	<0.000011	<0.000011	<0.000011	<0.000011	<0.000011	mg/l	TM4/PM30			
Benzo(k)fluoranthene	<0.000018	<0.000018	<0.000018	<0.000018	<0.000018	mg/l	TM4/PM30			
Benzo(a)pyrene	<0.000016	<0.000016	<0.000016	<0.000016	<0.000016	mg/l	TM4/PM30			
Indeno(123cd)pyrene	<0.000011	<0.000011	<0.000011	<0.000011	<0.000011	mg/l	TM4/PM30			
Dibenzo(ah)anthracene	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM4/PM30			
Benzo(ghi)perylene	<0.000011	<0.000011	<0.000011	<0.000011	<0.000011	mg/l	TM4/PM30			
PAH 16 Total	0.004260	0.001350	0.000200	<0.000195	<0.000195	mg/l	TM4/PM30			
Benzo(b)fluoranthene	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM4/PM30			
Benzo(k)fluoranthene	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM4/PM30			
PAH Surrogate % Recovery	93	96	86	99	<0	%	TM4/PM30			
EPH >C8-C10	<10	<10	<10	<10	<10	ug/l	TM5/PM30			
EPH >C10-C12	<10	<10	<10	<10	<10	ug/l	TM5/PM30			
EPH >C12-C16	<10	<10	<10	<10	<10	ug/l	TM5/PM30			
EPH >C16-C21	<10	<10	<10	<10	<10	ug/l	TM5/PM30			
EPH >C21-C35	<10	<10	<10	<10	<10	ug/l	TM5/PM30			
EPH >C8-C35	<10	<10	<10	<10	<10	ug/l	TM5/PM30			
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0			
Sulphate #	47.90	<0.05	0.38	27.13	<0.05	mg/l	TM38/PM0			
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM89/PM0			

Jones Environmental Laboratory

Client Name: Worley Parsons
Reference: Project Lindis
Location: Plumley Cheshire
Contact: Paul Ryman
JE Job No.: 14/3960

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	22-24	31-33	36-38							Please see attached notes for all abbreviations and acronyms		
Sample ID	BH-4 (S)	BH-1	BH-3(S)	BH-3(S)									
Depth	1.0-1.2	0.2-0.4	0.0-0.2	0.-0.4									
COC No / misc													
Containers	T	V J T	V J T	V J T									
Sample Date	11/03/2014	13/03/2014	13/03/2014	14/03/2014									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1							LOD/LOR	Units	Method No.
Date of Receipt	18/03/2014	18/03/2014	18/03/2014	18/03/2014									
Mass of raw test portion	0.1032	0.1116	0.1146	0.1135								kg	NONE/PM17
Leachant Volume	0.887	0.878	0.875	0.876								l	NONE/PM17
Dissolved Organic Carbon	3	7	5	2							<2	mg/l	TM60/PM0
pH	8.99	8.19	7.66	7.94							<0.01	pH units	TM73/PM0

Client Name: Worley Parsons
Reference: Project Lindis
Location: Plumley Cheshire
Contact: Paul Ryman

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

If asbestos fibres are reported at trace levels there will not be enough fibres to quantify and will be less than 0.001%.

Signed on behalf of Jones Environmental Laboratory:



Gemma Newsome
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Description	Asbestos Containing Material	Asbestos Results	Asbestos Level	Comments
14/3960	1	BH-4 (S)	0.5	3	20/03/14	soil/clay	None	NAD	NAD	
14/3960	1	TP-11	0.0-0.3	7	20/03/14	soil/clay	None	NAD	NAD	
14/3960	1	TP-10	0.0-0.3	11	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	TP-3	0.0-0.2	13	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	TP-8	0.0-0.3	15	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	TP-4	0.0-0.2	17	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	TP-7	0.0-0.3	19	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	TP-9	0.0-0.3	21	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	BH-1	0.2-0.4	23	20/03/14	soil/clay	None	NAD	NAD	
14/3960	1	TP-6	0.1-0.4	26	20/03/14	soil/clay	None	NAD	NAD	
14/3960	1	TP-5	0.2-0.4	28	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	TP-5	0.0-0.2	30	20/03/14	Soil/Stone	None	NAD	NAD	
14/3960	1	BH-3(S)	0.0-0.2	32	19/03/14	Soil/Clay	None	NAD	NAD	
14/3960	1	BH-3(S)	0.-0.4	37	19/03/14	Soil/Clay	None	NAD	NAD	

Client Name: Worley Parsons
Reference: Poject Lindis
Location: Plumley Cheshire
Contact: Paul Ryman

Matrix : CEN 10:1 1 Batch

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/3960

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory. It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
OC	Outside Calibration Range
NFD	No Fibres Detected
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS

JE Job No: 14/3960

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	16 PAH by GC-MS, modified USEPA 8270	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific			AR	Yes
TM4	16 PAH by GC-MS, modified USEPA 8270	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific			AR	
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.			AR	Yes
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes		AR	Yes
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific			AR	Yes
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes		AR	Yes
TM21	TOC and TC by Combustion	PM24	Eltra preparation			AD	Yes
TM26	Phenols by HPLC	PM0	No preparation is required.			AR	Yes
TM26	Phenols by HPLC	PM21	Methanol : NaOH extraction	Yes		AR	Yes

JE Job No: 14/3960

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM15	In-house method based on USEPA 3010A. Acid digestion of dried and crushed solid samples using Aqua Regia reflux.	Yes		AD	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM17	CEN PR12457-2 10:1 1 batch leach	Yes		AR	Yes
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.	Yes		AR	Yes
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM20	in-house method based on USEPA 1311 (TCLP). Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.	Yes		AD	Yes
TM60	TOC/DOC by NDIR	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification	PM42	Screening of soils for fibres			AR	
TM65	Asbestos Bulk Identification	PM42	Screening of soils for fibres	Yes		AR	
TM73	pH in by Metrohm	PM0	No preparation is required.			AR	Yes
TM73	pH in by Metrohm	PM11	1:2.5 soil/water extraction	Yes		AR	No
TM74	Water Soluble Boron by ICP-OES	PM32	Preparation of soils for WSB	Yes		AD	Yes

JE Job No: 14/3960

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM89	In-house method based on USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. ISO17025 accredited method for soils and waters and MCERTS on soils. Accreditation is matrix specific.	PM0	No preparation is required.	Yes		AR	Yes
TM89	In-house method based on USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. ISO17025 accredited method for soils and waters and MCERTS on soils. Accreditation is matrix specific.	PM45	Cyanide & Thiocyanate prep for soils	Yes		AR	Yes
NONE	No Method Code	PM17	CEN PR12457-2 10:1 1 batch leach				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Jones Environmental Laboratory

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LS6 2AH

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Fax: +44 (0) 1244 833781



Attention : Paul Ryman
Date : 28th March, 2014
Your reference : Lindis
Our reference : Test Report 14/4064 Batch 1
Location : Plumley, Cheshire
Date samples received : 21st March, 2014
Status : Final report
Issue : 1

Two samples were received for analysis on 21st March, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

Bob Millward BSc FRSC
Principal Chemist

Client Name: Worley Parsons
Reference: Lindis
Location: Plumley, Cheshire
Contact: Paul Ryman
JE Job No.: 14/4064

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-6		7-12							Please see attached notes for all abbreviations and acronyms			
	Sample ID	BH-2(S)	BH-4(S)								LOD/LOR	Units	Method No.
Depth													
COC No / misc													
Containers	V HN N P G		V HN N P G										
Sample Date	20/03/2014		20/03/2014										
Sample Type	Ground Water		Ground Water										
Batch Number	1		1										
Date of Receipt	21/03/2014		21/03/2014										
Dissolved Arsenic #	<2.5		12.1								<2.5	ug/l	TM30/PM14
Dissolved Boron	757		118								<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5		<0.5								<0.5	ug/l	TM30/PM14
Total Dissolved Chromium #	<1.5		<1.5								<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7		<7								<7	ug/l	TM30/PM14
Dissolved Lead #	<5		<5								<5	ug/l	TM30/PM14
Dissolved Mercury #	<1		<1								<1	ug/l	TM30/PM14
Dissolved Nickel #	<2		<2								<2	ug/l	TM30/PM14
Dissolved Selenium #	<3		<3								<3	ug/l	TM30/PM14
Dissolved Zinc #	<3		3								<3	ug/l	TM30/PM14
PAH MS													
Naphthalene #	0.390		0.210								<0.014	ug/l	TM4/PM30
Acenaphthylene #	0.050		<0.013								<0.013	ug/l	TM4/PM30
Acenaphthene #	0.030		<0.013								<0.013	ug/l	TM4/PM30
Fluorene #	0.020		0.030								<0.014	ug/l	TM4/PM30
Phenanthrene #	0.040		0.160								<0.011	ug/l	TM4/PM30
Anthracene #	<0.013		<0.013								<0.013	ug/l	TM4/PM30
Fluoranthene #	0.020		0.120								<0.012	ug/l	TM4/PM30
Pyrene #	0.020		0.090								<0.013	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.015		0.020								<0.015	ug/l	TM4/PM30
Chrysene #	<0.011		0.040								<0.011	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.018		0.030								<0.018	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.016		<0.016								<0.016	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.011		<0.011								<0.011	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.01		<0.01								<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.011		<0.011								<0.011	ug/l	TM4/PM30
PAH 16 Total #	0.570		0.700								<0.195	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01		0.02								<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01		<0.01								<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	84		83								<0	%	TM4/PM30
EPH (C8-C40) #	<10		<10								<10	ug/l	TM5/PM30
Phenol #	<0.01		<0.01								<0.01	mg/l	TM26/PM0
Sulphate #	55.70		21.40								<0.05	mg/l	TM38/PM0
Total Cyanide #	<0.01		<0.01								<0.01	mg/l	TM89/PM0
pH #	7.53		7.51								<0.01	pH units	TM73/PM0
Total Organic Carbon #	112		<2								<2	mg/l	TM60/PM0

Client Name: Worley Parsons
Reference: Lindis
Location: Plumley, Cheshire
Contact: Paul Ryman

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 14/4064						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/4064

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory. It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
OC	Outside Calibration Range
NFD	No Fibres Detected
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS



Jones Environmental Laboratory

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Leeds
LS6 2AH

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



Attention : Paul Ryman
Date : 7th April, 2014
Your reference : Project Lindis
Our reference : Test Report 14/4376 Batch 1
Location : Plumley, Cheshire
Date samples received : 29th March, 2014
Status : Final report
Issue : 1

Two samples were received for analysis on 29th March, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Kim Mills
Project Co-ordinator

Bob Millward BSc FRSC
Principal Chemist

Client Name: Worley Parsons
Reference: Project Lindis
Location: Plumley, Cheshire
Contact: Paul Ryman

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 14/4376						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/4376

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory. It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
OC	Outside Calibration Range
NFD	No Fibres Detected
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS

JE Job No: 14/4376

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM4	16 PAH by GC-MS, modified USEPA 8270	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM4	16 PAH by GC-MS, modified USEPA 8270	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM26	Phenols by HPLC	PM0	No preparation is required.	Yes			
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W.ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W.ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.	Yes			
TM60	TOC/DOC by NDIR	PM0	No preparation is required.	Yes			
TM73	pH in by Metrohm	PM0	No preparation is required.	Yes			
TM89	In-house method based on USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. ISO17025 accredited method for soils and waters and MCERTS on soils. Accreditation is matrix specific.	PM0	No preparation is required.	Yes			

JE Job No: 14/4064

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM4	16 PAH by GC-MS, modified USEPA 8270	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM4	16 PAH by GC-MS, modified USEPA 8270	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM26	Phenols by HPLC	PM0	No preparation is required.	Yes			
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.	Yes			
TM60	TOC/DOC by NDIR	PM0	No preparation is required.	Yes			
TM73	pH in by Metrohm	PM0	No preparation is required.	Yes			
TM89	In-house method based on USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. ISO17025 accredited method for soils and waters and MCERTS on soils. Accreditation is matrix specific.	PM0	No preparation is required.	Yes			

Appendix F

Safety Data Sheets

APPENDIX B

Material Safety Data Sheets

Motor Gasoline (Non Additized) Safety Data Sheet	2
Crude Oil Safety Data Sheet	46
Gas Oils (Petroleum) Heavy Atmospheric Safety Data Sheet.....	57

SAFETY DATA SHEET

SECTION 1

IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

As of the revision date above, this SDS meets the regulations in the United Kingdom & Ireland.

1.1. PRODUCT IDENTIFIER

Product Name: MOTOR GASOLINE (NON-ADDITIZED)
Product Description: Petroleum Hydrocarbons
Product Code: 708629-60

Registration Name:

Gasoline

Identification Number: (CAS #)86290-81-5

Registration Number:

01-2119471335-39-0000; 01-2119471335-39

Trade Names	Trade Names
EUROBOB	REGULAR PETROL ULS95 (UA)
SUPER PLUS UNLEADED ULS (UA)	ULS MOGAS 95 RON
ULS MOGAS 97 RON	ULS UNLEADED (UA)
UNLEADED MOGAS 91 RON	UNLEADED MOGAS 93 RON
UNLEADED MOGAS 95 RON	

1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

Intended Use: Fuel

Identified Uses:

Manufacture of substance
Distribution of substance
Use as an intermediate
Formulation and (re)packing of substances and mixtures
Use as a fuel - Industrial
Use as a fuel - Professional
Use as a fuel - Consumer

See Section 16 for list of REACH Use Descriptors for Identified Uses shown above.

Uses advised against: This product is not recommended for any industrial, professional or consumer use other than the Identified Uses above.

1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Supplier: Esso Petroleum Company Ltd.
Ermyrn Way
Ermyrn House
KT22 8UX LEATHERHEAD, SURREY
Great Britain

Supplier General Contact:
MSDS Internet Address:
E-Mail:

(UK) (+44) (0) 1372 222 000
www.msds.exxonmobil.com
sds.uk@exxonmobil.com

1.4. EMERGENCY TELEPHONE NUMBER

24 Hour Emergency Telephone:

(UK) (+44) (0) 1372 222 000

National Poison Control Centre:

(UK) 111 / (IE) 01 809 2166

SECTION 2 HAZARDS IDENTIFICATION

2.1. CLASSIFICATION OF SUBSTANCE OR MIXTURE

Classification according to Regulation (EC) No 1272/2008

Flammable liquid: Category 1.

Skin irritation: Category 2. Germ Cell Mutagen: Category 1B. Carcinogen: Category 1B. Reproductive toxicant (developmental): Category 2. Specific target organ toxicant (central nervous system): Category 3. Aspiration toxicant: Category 1.

Chronic aquatic toxicant: Category 2.

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H336: May cause drowsiness or dizziness. H340: May cause genetic defects. H350: May cause cancer. H361: Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

2.2. LABEL ELEMENTS

Label elements according to Regulation (EC) No 1272/2008

Pictograms:



Signal Word: Danger

Hazard Statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H336: May cause drowsiness or dizziness. H340: May cause genetic defects. H350: May cause cancer. H361: Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary Statements:

P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P261: Avoid breathing mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish. P391: Collect spillage.

P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.

P501: Dispose of contents and container in accordance with local regulations.

Contains: Gasoline

2.3. OTHER HAZARDS

Physical / Chemical Hazards:

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

Health Hazards:

High-pressure injection under skin may cause serious damage. May be irritating to the eyes, nose, throat, and lungs. Exposure to benzene is associated with cancer (acute myeloid leukaemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders (see Section 11).

Environmental Hazards:

No additional hazards. Material does not meet the criteria for PBT or vPvB in accordance with REACH Annex XIII.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

3.1. SUBSTANCES

This material is defined as a substance.

Reportable hazardous substance(s) complying with the classification criteria and/or with an exposure limit (OEL)

Name	CAS#	EC#	Registration#	Concentration *	GHS/CLP classification
Gasoline	86290-81-5	289-220-8	01-2119471335-39	100 %	[Aquatic Acute 2 H401], Aquatic Chronic 2 H411, Asp. Tox. 1 H304, Carc. 1B H350, Flam. Liq. 1 H224, Muta. 1B H340, Repr. 2 H361d, STOT SE 3 H336, Skin Irrit. 2 H315

Note - any classification in brackets is a GHS building block that was not adopted by the EU in the CLP regulation (No 1272/2008) and therefore is not applicable in the EU or in non-EU countries which have implemented the CLP regulation and is shown for informational purposes only.

Reportable hazardous constituent(s) contained in UVCB- and/or multi-constituent substance(s) complying with the classification criteria and/or with an exposure limit (OEL)

Name	CAS#	EC#	Concentration *	GHS/CLP Classification
Benzene	71-43-2	200-753-7	0.1 - 1.0%	[Acute Tox. 5 H303], Asp. Tox. 1 H304, Carc. 1A H350, Flam. Liq. 2 H225, Muta. 1B H340, [Aquatic Acute 2 H401], Skin Irrit. 2 H315, Eye Irrit. 2 H319, STOT RE 1 H372, Note E
Toluene	108-88-3	203-625-9	> 5.0 %	[Aquatic Acute 2 H401], Aquatic Chronic 3 H412, Asp. Tox. 1 H304, Flam. Liq. 2 H225, Repr. 2 H361d, STOT SE 3 H336, Skin Irrit. 2 H315, STOT RE 2 H373

Note - any classification in brackets is a GHS building block that was not adopted by the EU in the CLP regulation (No 1272/2008) and therefore is not applicable in the EU or in non-EU countries which have implemented the CLP regulation and is shown for informational purposes only.

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Note: See SDS Section 16 for full text of hazard statements.

3.2. MIXTURES Not Applicable. This product is regulated as a substance.

SECTION 4 FIRST AID MEASURES

4.1. DESCRIPTION OF FIRST AID MEASURES

INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

4.2. MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Headache, dizziness, drowsiness, nausea and other CNS effects. Itching, pain, redness, swelling of skin. Local necrosis as evidenced by delayed onset of pain and tissue damage a few hours after injection.

4.3. INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This material, or a component, may be associated with cardiac sensitization following very high exposures

(well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5	FIRE FIGHTING MEASURES
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5.1. EXTINGUISHING MEDIA

Suitable Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Unsuitable Extinguishing Media: Straight streams of water

5.2. SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Hazardous Combustion Products: Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

5.3. ADVICE FOR FIRE FIGHTERS

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Extremely Flammable. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

FLAMMABILITY PROPERTIES

Flash Point [Method]: <-35°C (-31°F) [IP 170/70]

Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 7.6 LEL: 1.4 [test method unavailable]

Autoignition Temperature: >250°C (482°F) [test method unavailable]

SECTION 6	ACCIDENTAL RELEASE MEASURES
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6.1. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H₂S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

6.2. ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

6.3. METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

6.4. REFERENCES TO OTHER SECTIONS

See Sections 8 and 13.

SECTION 7

HANDLING AND STORAGE

7.1. PRECAUTIONS FOR SAFE HANDLING

Avoid all personal contact. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003

(Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

7.2. CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, wellventilated area. Outside or detached storage preferred. Keep away from incompatible materials. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.

7.3. SPECIFIC END USES

Section 1 informs about identified end-uses. No industrial or sector specific guidance available.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. CONTROL PARAMETERS

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Source
Benzene		TWA	3.25 mg/m3	1 ppm	Skin	UK EH40
Benzene		STEL	1 ppm			ExxonMobil
Benzene		TWA	0.5 ppm			ExxonMobil
Gasoline		STEL	200 ppm			ExxonMobil
Gasoline		TWA	100 ppm			ExxonMobil
Toluene		STEL	384 mg/m3	100 ppm	Skin	UK EH40
Toluene		TWA	191 mg/m3	50 ppm	Skin	UK EH40
Toluene		TWA	20 ppm			ACGIH

UK EH40 Workplace Exposure Limits. Exposure limits for use with Control of Substances Hazardous to Health Regulations 2002 (as amended)

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

UK Health and Safety Executive (HSE)

DERIVED NO EFFECT LEVEL (DNEL)/DERIVED MINIMAL EFFECT LEVEL (DMEL)

Worker

Substance Name	Dermal	Inhalation
Gasoline	NA	840 mg/m3 DNEL, Chronic Exposure, Local Effects

Consumer

Substance Name	Dermal	Inhalation	Oral
Gasoline	NA	180 mg/m3 DNEL, Chronic Exposure, Local Effects	NA

Note: The Derived No Effect Level (DNEL) is an estimated safe level of exposure that is derived from toxicity data in accord with specific guidance within the European REACH regulation. The DNEL may differ from an Occupational Exposure Limit (OEL) for the same chemical. OELs may be recommended by an individual company, a governmental regulatory body or an expert organization, such as the Scientific Committee for Occupational Exposure Limits (SCOEL) or the American Conference of Governmental Industrial Hygienists (ACGIH). OELs are considered to be safe exposure levels for a typical worker in an occupational setting for an 8-hour work shift, 40 hour work week, as a time weighted average (TWA) or a 15 minute short-term exposure limit (STEL). While also considered to be protective of health, OELs are derived by a process different from that of REACH.

PREDICTED NO EFFECT CONCENTRATION (PNEC)

Substance Name	Aqua (fresh water)	Aqua (marine water)	Aqua (intermittent release)	Sewage treatment plant	Sediment	Soil	Oral (secondary poisoning)
Gasoline	NA	NA	NA	NA	NA	NA	NA

For hydrocarbon UVCBs, no single PNEC value is identified for the overall substance or used in risk assessment calculations. Therefore, no PNEC values are disclosed in the above table. For further information, please contact ExxonMobil.

8.2. EXPOSURE CONTROLS

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions.

Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Half-face filter respirator Type AX filter material, European Committee for Standardization (CEN) standards EN 136, 140 and 405 provide respirator masks and EN 149 and 143 provide filter recommendations.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. Nitrile, minimum 0.38 mm thickness or comparable protective barrier material with a high performance level for continuous contact use conditions, permeation breakthrough minimum 480 minutes in accordance with CEN standards EN 420 and EN 374.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

For Summary of Risk Management Measures across all identified uses, see Annex.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Colour: Pale Yellow
Odour: Characteristic
Odour Threshold: No data available
pH: Not technically feasible
Melting Point: No data available
Freezing Point: No data available
Initial Boiling Point / and Boiling Range: 28°C (82°F) - 210°C (410°F) [EN ISO 3405]
Flash Point [Method]: <-35°C (-31°F) [IP 170/70]
Evaporation Rate (n-butyl acetate = 1): No data available
Flammability (Solid, Gas): Not technically feasible
Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 7.6 LEL: 1.4 [test method unavailable]
Vapour Pressure: [N/D at 20 °C] | 4 kPa (30 mm Hg) at 37.8 °C - 240 kPa (1800 mm Hg) at 37.8°C [test method unavailable]
Vapour Density (Air = 1): > 1 at 101 kPa [test method unavailable]
Relative Density (at 15 °C): < 1 [test method unavailable]
Solubility(ies): water Negligible
Partition coefficient (n-Octanol/Water Partition Coefficient): > 3.5 [test method unavailable]
Autoignition Temperature: >250°C (482°F) [test method unavailable]
Decomposition Temperature: No data available
Viscosity: <1 cSt (1 mm²/sec) at 40°C [test method unavailable]
Explosive Properties: None
Oxidizing Properties: None

9.2. OTHER INFORMATION

Density (at 15 °C): 620 kg/m³ (5.17 lbs/gal, 0.62 kg/dm³) - 880 kg/m³ (7.34 lbs/gal, 0.88 kg/dm³) [test method unavailable]

SECTION 10 STABILITY AND REACTIVITY

10.1. REACTIVITY: See sub-sections below.

10.2. CHEMICAL STABILITY: Material is stable under normal conditions.

10.3. POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

10.4. CONDITIONS TO AVOID: Heat, sparks, flame, and build up of static electricity.

10.5. INCOMPATIBLE MATERIALS: Alkalies, Halogens, Strong Acids, Strong oxidisers

10.6. HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

SECTION 11 TOXICOLOGICAL INFORMATION	
11.1. INFORMATION ON TOXICOLOGICAL EFFECTS	
Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) LC50 > 5000 mg/m ³ (Vapour) Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation (Rabbit): Data available. Test scores or other study results meet criteria for classification.	Irritating to the skin. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation (Rabbit): Data available. Test scores or other study results do not meet criteria for classification.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physicochemical properties of the material.
Germ Cell Mutagenicity: Data available.	Caused genetic effects in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475 476
Carcinogenicity: Data available.	Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Caused damage to the fetus in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 416 421
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	May cause drowsiness or dizziness.

Repeated Exposure: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 410 412 453
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OTHER INFORMATION

For the product itself:

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapours in the same boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats, male and female mice, or in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. In 1991, The U.S. EPA determined that the male rat kidney is not useful for assessing human risk. Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug. Gasoline unleaded: Carcinogenic in animal tests. Chronic inhalation studies resulted in liver tumours in female mice and kidney tumours in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations in-vitro or in-vivo. Negative in inhalation developmental studies and reproductive tox studies. Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing).

Contains:

BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer in laboratory animal studies.
TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects.

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

12.1. TOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

12.2. PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

Majority of components -- Expected to degrade rapidly in air

12.3. BIOACCUMULATIVE POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

12.4. MOBILITY IN SOIL

Majority of components -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Low molecular wt. component -- Moderate potential to migrate through soil.

High molecular wt. component -- Low potential to migrate through soil.

12.5. PERSISTENCE, BIOACCUMULATION AND TOXICITY FOR SUBSTANCE(S)

This product is not, or does not contain, a substance that is a PBT or a vPvB.

12.6. OTHER ADVERSE EFFECTS

No adverse effects are expected.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	EL50 1 - 100 mg/l: data for similar materials
Aquatic - Acute Toxicity	96 hour(s)	Fish	LL50 1 - 100 mg/l: data for similar materials
Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	EL50 1 - >1000 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 - 10 mg/l: data for similar materials
Aquatic - Chronic Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	NOELR 1 - 100 mg/l: data for similar materials

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results: Basis
Water	Ready Biodegradability	28 day(s)	Percent Degraded < 60 : similar material

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

13.1. WASTE TREATMENT METHODS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

European Waste Code: 13 07 02*

NOTE: These codes are assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste producers need to assess the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code(s).

This material is considered as hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should

be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14	TRANSPORT INFORMATION
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LAND (ADR/RID)

- 14.1. UN Number: 1203
- 14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL
- 14.3. Transport Hazard Class(es): 3
- 14.4. Packing Group: II
- 14.5. Environmental Hazards: Yes
- 14.6. Special Precautions for users:
Classification Code: F1
Label(s) / Mark(s): 3, EHS
Hazard ID Number: 33
Hazchem EAC: 3YE

INLAND WATERWAYS (ADNR/ADN)

- 14.1. UN (or ID) Number: 1203
- 14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL
- 14.3. Transport Hazard Class(es): 3
- 14.4. Packing Group: II
- 14.5. Environmental Hazards: Yes
- 14.6. Special Precautions for users:
Hazard ID Number: 33
Label(s) / Mark(s): 3 (N2, CMR, F), EHS

SEA (IMDG)

- 14.1. UN Number: 1203
- 14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL
- 14.3. Transport Hazard Class(es): 3
- 14.4. Packing Group: II
- 14.5. Environmental Hazards: Marine Pollutant
- 14.6. Special Precautions for users:
Label(s): 3
EMS Number: F-E, S-E
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-35°C c.c.), MARINE POLLUTANT

SEA (MARPOL 73/78 Convention - Annex II):

- 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not classified according to Annex II

AIR (IATA)

- 14.1. UN Number: 1203
- 14.2. UN Proper Shipping Name (Technical Name): MOTOR SPIRIT or GASOLINE or PETROL
- 14.3. Transport Hazard Class(es): 3
- 14.4. Packing Group: II
- 14.5. Environmental Hazards: Yes
- 14.6. Special Precautions for users:
Label(s) / Mark(s): 3
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II

SECTION 15	REGULATORY INFORMATION
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REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA): AICS, DSL, KECl, PICCS, TSCA

15.1. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

Applicable EU Directives and Regulations:

1907/2006 [... on the Registration, Evaluation, Authorisation and Restriction of Chemicals ... and amendments thereto]

Annex XVII restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles identified in Regulation 1907/2006/EC [...on the Registration, Evaluation, Authorisation and Restrictions of Chemicals ... and amendments thereto]

92/85/EEC [...pregnant workers...recently given birth or...breastfeeding directive]

2004/42/CE [on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC.]

94/33/EC [...on the protection of young people at work]

96/82/EC as extended by 2003/105/EC [... on the control of major-accident hazards involving dangerous substances]. Product contains a substance that falls within the criteria defined in Annex I.

Refer to Directive for details of requirements taking into account the volume of product stored on site.

111/2005/EC [...laying down rules for drug precursors ...]

2004/37/EC [... on the protection of workers from the risks related to carcinogens or mutagens...]

98/24/EC [... on the protection of workers from the risk related to chemical agents at work ...].

Refer to Directive for details of requirements.

1272/2008 [on classification, labelling and packaging of substances and mixtures.. and amendments thereto]

15.2. CHEMICAL SAFETY ASSESSMENT

REACH Information: A Chemical Safety Assessment has been carried out for one or more substances present in the material.

SECTION 16	OTHER INFORMATION
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IDENTIFIED USES:

Manufacture of substance (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU10, SU3, SU8, SU9)

Distribution of substance (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU3, SU8, SU9)

Use as an intermediate (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU3, SU8, SU9)

Formulation and (re)packing of substances and mixtures (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU10, SU3)

Use as a fuel - Industrial (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU3)

Use as a fuel - Professional (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU22)

Use as a fuel - Consumer (PC13, SU21)

REFERENCES: Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, CONCAWE Product Dossiers, publications from other trade

associations, such as the EU Hydrocarbon Solvents REACH Consortium, U.S. HPV Program Robust Summaries, the EU IUCLID Data Base, U.S. NTP publications, and other sources, as appropriate.

List of abbreviations and acronyms that could be (but not necessarily are) used in this safety data sheet:

Acronym	Full text
N/A	Not applicable
N/D	Not determined
NE	Not established
VOC	Volatile Organic Compound
AICS	Australian Inventory of Chemical Substances
AIHA WEEL	American Industrial Hygiene Association Workplace Environmental Exposure Limits
ASTM	ASTM International, originally known as the American Society for Testing and Materials (ASTM)
DSL	Domestic Substance List (Canada)
EINECS	European Inventory of Existing Commercial Substances
ELINCS	European List of Notified Chemical Substances
ENCS	Existing and new Chemical Substances (Japanese inventory)
IECSC	Inventory of Existing Chemical Substances in China
KECI	Korean Existing Chemicals Inventory
NDSL	Non-Domestic Substances List (Canada)
NZIoC	New Zealand Inventory of Chemicals
PICCS	Philippine Inventory of Chemicals and Chemical Substances
TLV	Threshold Limit Value (American Conference of Governmental Industrial Hygienists)
TSCA	Toxic Substances Control Act (U.S. inventory)
UVCB	Substances of Unknown or Variable composition, Complex reaction products or Biological materials
LC	Lethal Concentration
LD	Lethal Dose
LL	Lethal Loading
EC	Effective Concentration
EL	Effective Loading
NOEC	No Observable Effect Concentration
NOELR	No Observable Effect Loading Rate

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

Flam. Liq. 1 H224: Extremely flammable liquid and vapor; Flammable Liquid, Cat 1

Flam. Liq. 2 H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2

[Acute Tox. 5 H303]: May be harmful if swallowed; Acute Tox Oral, Cat 5

Asp. Tox. 1 H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

Skin Irrit. 2 H315: Causes skin irritation; Skin Corr/Irritation, Cat 2

Eye Irrit. 2 H319: Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2

STOT SE 3 H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic

Muta. 1B H340: May cause genetic defects; Germ Cell Mutagenicity, Cat 1B

Carc. 1A H350: May cause cancer; Carcinogenicity, Cat 1A

Carc. 1B H350: May cause cancer; Carcinogenicity, Cat 1B
 Repr. 2 H361d: Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
 STOT RE 1 H372: Causes damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 1
 STOT RE 2 H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
 [Aquatic Acute 2 H401]: Toxic to aquatic life; Acute Env Tox, Cat 2
 Aquatic Chronic 2 H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
 Aquatic Chronic 3 H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

- Manufacture of other substances: Annex Information information was deleted.
- Manufacture of other substances: Section 1: Use Table information was deleted.
- Rubber production and processing: Annex Information information was deleted.
- Rubber production and processing: Section 1: Use Table information was deleted.
- Section 06: Accidental Release - Spill Management - Land information was modified.
- Use in Cleaning Agents - Industrial: Annex Information information was deleted.
- Use in Cleaning Agents - Industrial: Section 1: Use Table information was deleted.
- Use in Coatings - Industrial: Annex Information information was deleted.
- Use in Coatings - Industrial: Section 1: Use Table information was deleted.

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Internal Use Only

MHC: 1A, 0B, 0, 0, 4, 1

PPEC: CF

DGN: 7108743XGB (1018151)

ANNEX	
Section 1 Exposure Scenario Title	
Title:	
Manufacture of substance	
Use Descriptor	
Sector(s) of Use	SU10, SU3, SU8, SU9
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC1

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Specific Environmental Release Category	ESVOC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as an intermediate, process chemical or extracting agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	

Duration, frequency and amount
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented [G1] Operation is carried out at elevated temperature (>20 C above ambient temperature)[OC7]
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)

General measures (Aspiration Hazard)

The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a nonquantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard.

Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General measures (Flammable Liquid)**

Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level.

Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.

General measures (skin irritants)

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General measures (carcinogens)**

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems) Continuous process PROC1 Handle substance within a closed system.

General exposures (closed systems) with sample collection PROC2

Wear suitable gloves tested to EN374.

Sample via a closed loop or other system to avoid exposure.

Handle substance within a closed system.

General exposures (closed systems) Batch process PROC3

Ensure operation is undertaken outdoors.

Handle substance within a closed system.

Laboratory activities PROC15

Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Bulk transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

Equipment cleaning and maintenance PROC8a

Drain down and flush system prior to equipment break-in or maintenance.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.

Storage PROC2

Ensure operation is undertaken outdoors.

Store substance within a closed system.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

<p>Duration, frequency and amount</p> <p>Annual site tonnage (tonnes/year): 600000 tons/yr Continuous release. Emission Days (days/year): 300 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 0.027 Maximum daily site tonnage (kg/d): 2000000 kg / day Regional use tonnage (tonnes/year): 22000000 tons/yr</p>
<p>Environmental factors not influenced by risk management</p> <p>Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100</p>
<p>Other given operational conditions affecting environmental exposure</p> <p>Release fraction to air from process (initial release prior to RMM): 0.05 Release fraction to soil from process (initial release prior to RMM): 0.0001 Release fraction to wastewater from process (initial release prior to RMM): 0.003</p>
<p>Technical conditions and measures at process level (source) to prevent release</p> <p>Common practices vary across sites thus conservative process release estimates used.</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p> <p>If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: 94.7 % Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: 99.8 %</p>
<p>Organisation measures to prevent/limit release from site</p> <p>Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.</p>
<p>Conditions and measures related to municipal sewage treatment plant</p> <p>Assumed domestic sewage treatment plant effluent flow is:[STP5] 10000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 2000000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 99.8 %</p>
<p>Conditions and measures related to external treatment of waste for disposal</p> <p>During manufacturing no waste of the substance is generated [ETW4]</p>
<p>Conditions and measures related to external recovery of waste</p> <p>During manufacturing no waste of the substance is generated [ERW2]</p>

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Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.[EE2]
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]
4.2. Environment
Further details on scaling and control technologies are provided in factsheet Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e. RCRs >1), additional RMMs or a site-specific chemical safety assessment is required. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - 'Site-Specific Production' worksheet. [DSU6]

Section 1 Exposure Scenario Title	
Title:	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	SU3, SU8, SU9
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC4, ERC6A, ERC6B, ERC6C, ERC6D, ERC7
Specific Environmental Release Category	ESVOC 1.1b.v1
Processes, tasks, activities covered	
Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	

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Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)
<p>General measures (Aspiration Hazard) The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a nonquantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. General measures (Flammable Liquid) Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level. Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.</p> <p>General measures (skin irritants) Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. General measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific</p>

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activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems) PROC1 Handle substance within a closed system.

General exposures (closed systems) with sample collection PROC2

Handle substance within a closed system.

Sample via a closed loop or other system to avoid exposure.

Wear suitable gloves tested to EN374.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system.

Process sampling PROC3

Sample via a closed loop or other system to avoid exposure.

Laboratory activities PROC15

Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Bulk closed loading and unloading PROC8b

Ensure material transfers are under containment or extract ventilation.

Equipment cleaning and maintenance PROC8a

Drain down and flush system prior to equipment break-in or maintenance.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Clear spills immediately.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Storage PROC2

Ensure operation is undertaken outdoors.

Store substance within a closed system.

Bulk closed loading PROC8b

Ensure material transfers are under containment or extract ventilation.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 51000 tons/yr Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.002

Maximum daily site tonnage (kg/d): 170000 kg / day

Regional use tonnage (tonnes/year): 25000000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

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<p>Release fraction to air from process (initial release prior to RMM): 0.001 Release fraction to soil from process (initial release prior to RMM): 0.00001 Release fraction to wastewater from process (initial release prior to RMM): 0.00001</p>
<p>Technical conditions and measures at process level (source) to prevent release</p>
<p>Common practices vary across sites thus conservative process release estimates used.</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p>
<p>If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.</p>
<p>If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$ Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of $\geq 83.3\%$</p>
<p>Organisation measures to prevent/limit release from site</p>
<p>Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.</p>
<p>Conditions and measures related to municipal sewage treatment plant</p>
<p>Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 670000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 95.8 %</p>
<p>Conditions and measures related to external treatment of waste for disposal</p>
<p>External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]</p>
<p>Conditions and measures related to external recovery of waste</p>
<p>External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1]</p>
<p>Section 3 Exposure Estimation</p>
<p>3.1. Health</p>
<p>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]</p>
<p>3.2. Environment</p>
<p>The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.[EE2]</p>
<p>Section 4 Guidance to check compliance with the Exposure Scenario</p>
<p>4.1. Health</p>
<p>Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33] Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]</p>

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4.2. Environment

Further details on scaling and control technologies are provided in factsheet
 Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Section 1 Exposure Scenario Title

Title:

Use as an intermediate

Use Descriptor

Sector(s) of Use	SU3, SU8, SU9
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC6A
Specific Environmental Release Category	ESVOC 6.1a.v1

Processes, tasks, activities covered

Use as an intermediate (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

Section 2 Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Product Characteristic

Liquid

Duration, frequency and amount

Covers daily exposures up to 8 hours (unless stated differently)[G2]

Covers percentage substance in the product up to 100 %[G13]

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented [G1]

Operation is carried out at elevated temperature (>20 C above ambient temperature)[OC7]

Contributing Scenarios/

Specific Risk Management Measures and Operating Conditions

(only required controls to demonstrate safe use listed)

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General measures (Aspiration Hazard)

The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a nonquantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard.

Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General**

measures (Flammable Liquid)

Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level.

Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.

General measures (skin irritants)

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General measures (carcinogens)**

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible,

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prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems) Continuous process PROC1 Handle substance within a closed system.

General exposures (closed systems) with sample collection PROC2

Wear suitable gloves tested to EN374.

Handle substance within a closed system.

Sample via a closed loop or other system to avoid exposure.

General exposures (closed systems) Batch process PROC3

Ensure operation is undertaken outdoors.

Laboratory activities PROC15

Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Bulk transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

Equipment cleaning and maintenance PROC8a

Drain down and flush system prior to equipment break-in or maintenance.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.

Storage PROC2

Ensure operation is undertaken outdoors.

Store substance within a closed system.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 15000 tons/yr Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.0013

Maximum daily site tonnage (kg/d): 50000 kg / day

Regional use tonnage (tonnes/year): 11000000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM): 0.025

Release fraction to soil from process (initial release prior to RMM): 0.001

Release fraction to wastewater from process (initial release prior to RMM): 0.003

Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used.

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<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p> <p>If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: 57.4 % Risk from environmental exposure is driven by freshwater sediment.</p>
<p>Treat air emissions to provide a typical removal (or abatement?) efficiency of: 80 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: 98.2 %</p>
<p>Organisation measures to prevent/limit release from site</p> <p>Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.</p>
<p>Conditions and measures related to municipal sewage treatment plant</p> <p>Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 50000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 98.2 %</p>
<p>Conditions and measures related to external treatment of waste for disposal</p> <p>This substance is consumed during use and no waste of the substance is generated [ETW5]</p>
<p>Conditions and measures related to external recovery of waste</p> <p>This substance is consumed during use and no waste of the substance is generated [ERW3]</p>
<p>Section 3 Exposure Estimation</p>
<p>3.1. Health</p> <p>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]</p>
<p>3.2. Environment</p> <p>The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.[EE2]</p>
<p>Section 4 Guidance to check compliance with the Exposure Scenario</p>
<p>4.1. Health</p> <p>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32] Available hazard data do not support the need for a DNEL to be established for other health effects.[G36] Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Risk Management Measures are based on qualitative risk characterisation. [G37] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]</p>
<p>4.2. Environment</p>

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Further details on scaling and control technologies are provided in factsheet
 Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Section 1 Exposure Scenario Title	
Title:	
Formulation and (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	SU10, SU3
Process Categories	PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC2
Specific Environmental Release Category	ESVOC 2.2.v1
Processes, tasks, activities covered	
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)	

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General measures (Aspiration Hazard)

The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a nonquantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard.

Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General**

measures (Flammable Liquid)

Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level.

Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.

General measures (skin irritants)

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General measures (carcinogens)**

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible,

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prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems) PROC1 Handle substance within a closed system.

General exposures (closed systems) with sample collection PROC2

Handle substance within a closed system.

Sample via a closed loop or other system to avoid exposure.

Wear suitable gloves tested to EN374.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system.

Process sampling PROC3

Sample via a closed loop or other system to avoid exposure.

Laboratory activities PROC15

Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

Bulk transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

Equipment cleaning and maintenance PROC8a

Drain down and flush system prior to equipment break-in or maintenance.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Clear spills immediately.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Storage PROC2

Store substance within a closed system.

Wear suitable gloves tested to EN374.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 30000 tons/yr Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.0022

Maximum daily site tonnage (kg/d): 100000 kg / day

Regional use tonnage (tonnes/year): 14000000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

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<p>Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements): [OOC11] 0.025 Release fraction to soil from process (initial release prior to RMM): 0.0001 Release fraction to wastewater from process (initial release prior to RMM): 0.002</p>
<p>Technical conditions and measures at process level (source) to prevent release</p>
<p>Common practices vary across sites thus conservative process release estimates used.</p>

<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p>
<p>If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: 68 % Risk from environmental exposure is driven by freshwater sediment. Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: 98.7 %</p>

<p>Organisation measures to prevent/limit release from site</p>
<p>Do not apply industrial sludge to natural soils. Prevent discharge of undissolved substance to or recover from wastewater. Sludge should be incinerated, contained or reclaimed.</p>

<p>Conditions and measures related to municipal sewage treatment plant</p>
<p>Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 100000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 98.7 %</p>

<p>Conditions and measures related to external treatment of waste for disposal</p>
<p>External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]</p>
<p>Conditions and measures related to external recovery of waste</p>
<p>External recovery an recycling of waste should comply with applicable local and/or national regulations [ERW1]</p>

Section 3 Exposure Estimation

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2]

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

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Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32]
 Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]
 Risk Management Measures are based on qualitative risk characterisation. [G37]
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]

4.2. Environment

Further details on scaling and control technologies are provided in factsheet
 Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Section 1 Exposure Scenario Title	
Title:	
Use as a fuel - Industrial	
Use Descriptor	
Sector(s) of Use	SU3
Process Categories	PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC7
Specific Environmental Release Category	ESVOC 7.12a.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)	

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General measures (Aspiration Hazard)

The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a nonquantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard.

Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General**

measures (Flammable Liquid)

Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level.

Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.

General measures (skin irritants)

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General measures (carcinogens)**

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific

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activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Bulk closed unloading PROC8b

Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

refuelling PROC8b

Ensure material transfers are under containment or extract ventilation.

refuelling aircraft PROC8b

Ensure material transfers are under containment or extract ventilation.

General exposures (closed systems) PROC1 Handle substance within a closed system. **General exposures (closed systems)**

PROC2 Handle substance within a closed system.

Wear suitable gloves tested to EN374.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system. **Use as a fuel**

(closed systems) PROC16 Handle substance within a closed system.

Equipment cleaning and maintenance PROC8a

Drain down system prior to equipment break-in or maintenance.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Clear spills immediately.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

Storage PROC2

Store substance within a closed system. provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 1500000 tons/yr Continuous release.

Emission Days (days/year): 300 days/yr

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.89

Maximum daily site tonnage (kg/d): 5000000 kg / day

Regional use tonnage (tonnes/year): 1700000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

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<p>Other given operational conditions affecting environmental exposure</p> <p>Release fraction to air from process (initial release prior to RMM): 0.05 Release fraction to soil from process (initial release prior to RMM): 0 Release fraction to wastewater from process (initial release prior to RMM): 0.00001</p>
<p>Technical conditions and measures at process level (source) to prevent release</p> <p>Common practices vary across sites thus conservative process release estimates used.</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p> <p>If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq 0\%$ Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). Treat air emissions to provide a typical removal (or abatement?) efficiency of: 95 % Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of $\geq 94.6\%$</p>
<p>Organisation measures to prevent/limit release from site</p> <p>Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.</p>
<p>Conditions and measures related to municipal sewage treatment plant</p> <p>Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 5000000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 95.8 %</p>
<p>Conditions and measures related to external treatment of waste for disposal</p> <p>Combustion emissions considered in regional exposure assessment [ETW2] Combustion emissions limited by required exhaust emission controls [ETW1] External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]</p>
<p>Conditions and measures related to external recovery of waste</p> <p>This substance is consumed during use and no waste of the substance is generated [ERW3]</p>
<p>Section 3 Exposure Estimation</p>
<p>3.1. Health</p> <p>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]</p>
<p>3.2. Environment</p> <p>The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.[EE2]</p>
<p>Section 4 Guidance to check compliance with the Exposure Scenario</p>
<p>4.1. Health</p>

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Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32]
 Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]
 Risk Management Measures are based on qualitative risk characterisation. [G37]
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]

4.2. Environment

Further details on scaling and control technologies are provided in factsheet
 Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Section 1 Exposure Scenario Title	
Title:	
Use as a fuel - Professional	
Use Descriptor	
Sector(s) of Use	SU22
Process Categories	PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b
Environmental Release Categories	ERC9A, ERC9B
Specific Environmental Release Category	ESVOC 9.12b.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Covers daily exposures up to 8 hours (unless stated differently)[G2] Covers percentage substance in the product up to 100 %[G13]	
Other given operational conditions affecting workers exposure	
Assumes a good basic standard of occupational hygiene is implemented [G1] Assumes use at not more than 20°C above ambient temperature[G15]	
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)	

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General measures (Aspiration Hazard)

The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a nonquantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard.

Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. **General**

measures (Flammable Liquid)

Risks from the physicochemical hazards of substances, such as flammability or explosiveness can be controlled by implementing risk management measures at the workplace. It is recommended to follow the recast ATEX Directive 2014/34/EU. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, the risk can be regarded as controlled to an acceptable level.

Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances. Restrict line velocity during pumping to avoid generation of electrostatic discharge. Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.

General measures (skin irritants)

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. **General measures (carcinogens)**

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific

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activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems) PROC1 Handle substance within a closed system. **General exposures (closed systems) PROC2** Wear suitable gloves tested to EN374.

Handle substance within a closed system.

General exposures (closed systems) Outdoor. PROC3

Handle substance within a closed system.

Bulk closed unloading PROC8b

Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers PROC8b

Ensure material transfers are under containment or extract ventilation.

refuelling PROC8b

Ensure material transfers are under containment or extract ventilation.

Use as a fuel (closed systems) PROC16 Handle substance within a closed system.

Equipment maintenance PROC8a

Drain down system prior to equipment break-in or maintenance.

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Clear spills immediately. provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Ensure operatives are trained to minimise exposures.

Storage PROC2

Store substance within a closed system. provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

Section 2.2 Control of environmental exposure

Product characteristics

Predominantly hydrophobic.

Substance is complex UVCB.

Duration, frequency and amount

Annual site tonnage (tonnes/year): 590 tons/yr Continuous release.

Emission Days (days/year): 365

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used Locally: 0.0005

Maximum daily site tonnage (kg/d): 1600

Regional use tonnage (tonnes/year): 1200000 tons/yr

Environmental factors not influenced by risk management

Local freshwater dilution factor [EF1] 10

Local marine water dilution factor: [EF2] 100

Other given operational conditions affecting environmental exposure

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<p>Release fraction to air from wide dispersive use (regional only): 0.01 Release fraction to soil from wide dispersive use (regional only): 0.00001 Release fraction to wastewater from wide dispersive use: 0.00001</p>
<p>Technical conditions and measures at process level (source) to prevent release</p>

<p>Common practices vary across sites thus conservative process release estimates used.</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p>
<p>If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 % Risk from environmental exposure is driven by freshwater. Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 81.8 %</p>

<p>Organisation measures to prevent/limit release from site</p>
<p>Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.</p>

<p>Conditions and measures related to municipal sewage treatment plant</p>
<p>Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 7000 kg / day Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 95.8 %</p>

<p>Conditions and measures related to external treatment of waste for disposal</p>
<p>Combustion emissions considered in regional exposure assessment [ETW2] Combustion emissions limited by required exhaust emission controls [ETW1] External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]</p>

<p>Conditions and measures related to external recovery of waste</p>
<p>This substance is consumed during use and no waste of the substance is generated [ERW3]</p>

Section 3 Exposure Estimation

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21]

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.[EE2]

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

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Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. [G32]
 Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]
 Risk Management Measures are based on qualitative risk characterisation. [G37]
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]

4.2. Environment

Further details on scaling and control technologies are provided in factsheet
 Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Section 1 Exposure Scenario Title	
Title:	
Use as a fuel - Consumer	
Use Descriptor	
Sector(s) of Use	SU21
Product Categories	PC13
Environmental Release Categories	ERC9A, ERC9B
Specific Environmental Release Category	ESVOC 9.12c.v1
Processes, tasks, activities covered	
Covers consumer uses in liquid fuels.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of consumer exposure	
Product Characteristic	
Liquid	
Duration, frequency and amount	
Not applicable	
Other given operational conditions affecting consumer exposure	
Not applicable	
Contributing Scenarios/ Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)	

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General measures (Aspiration Hazard)

The H304 risk phrase (May be fatal if swallowed and enters airways) relates to potential for aspiration, a nonquantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures need to be implemented to control the aspiration hazard. Do not ingest. If swallowed then seek immediate medical attention. Do NOT induce vomiting. Just a sip of lamp oil - or even sucking the wick of lamps may lead to life threatening lung damage. Keep lamps filled with this liquid out of the reach of children.

General measures (Flammable Liquid)

Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures. For flammable substances a selection of the following measures need to be implemented to control unintended ignition of flammable substances. These measures are expected to be suitable to prevent minor accidents which might occur during consumer use. Based on the implementation of a selection of handling and storage risk management measures for the identified uses, it is anticipated that there is no immediate concern as the risk should be controlled to an acceptable level. Use only with adequate ventilation. Avoid ignition sources – No Smoking. Review SDS for additional advice.

Liquid: Automotive Refuelling PC13

Covers concentrations up to 1 %

Covers use up to 1 times per day

Covers use up to 52 days/yr

Covers skin contact area up to 210 cm²

For each use event, covers use amounts up to 37500 grams Covers outdoor use.

Covers use in room size of 100 m³ Covers exposure up to 0.05 hour(s) Covers use at ambient temperatures.

Liquid, vapour pressure > 10 kPa at STP.

Liquid Scooter Refuelling PC13

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<p>Covers concentrations up to 1 % Covers use up to 1 times per day Covers use up to 52 days/yr Covers skin contact area up to 210 cm² For each use event, covers use amounts up to 3750 grams Covers outdoor use. Covers use in room size of 100 m³ Covers exposure up to 0.03 hour(s) Covers use at ambient temperatures. Liquid, vapour pressure > 10 kPa at STP. Liquid, Garden Equipment - Use PC13 Covers concentrations up to 1 % Covers use up to 1 times per day Covers use up to 26 days/yr For each use event, covers use amounts up to 750 grams Covers outdoor use. Covers use in room size of 100 m³ Covers exposure up to 2 hour(s) Covers skin contact area up to 420 cm² Covers use at ambient temperatures. Liquid, vapour pressure > 10 kPa at STP. Liquid: Garden Equipment - Refueling PC13 Covers concentrations up to 1 % Covers use up to 1 times per day Covers use up to 26 days/yr Covers skin contact area up to 420 cm² For each use event, covers use amounts up to 750 grams Covers use in a one car garage (34 m³) under typical ventilation. 1.5 Air changes per hour Covers use in room size of 34 m³ Covers exposure up to 0.03 hour(s) Covers use at ambient temperatures. Liquid, vapour pressure > 10 kPa at STP.</p>
<p>Section 2.2 Control of environmental exposure</p>
<p>Product characteristics</p> <p>Predominantly hydrophobic. Substance is complex UVCB.</p>
<p>Duration, frequency and amount</p> <p>Annual site tonnage (tonnes/year): 4600 tons/yr Continuous release. Emission Days (days/year): 365 days/yr Fraction of EU tonnage used in region: 0.1 Fraction of Regional tonnage used Locally: 0.0005 Maximum daily site tonnage (kg/d): 12000 kg / day Regional use tonnage (tonnes/year): 9100000 tons/yr</p>
<p>Environmental factors not influenced by risk management</p> <p>Local freshwater dilution factor [EF1] 10 Local marine water dilution factor: [EF2] 100</p>

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Other given operational conditions affecting environmental exposure
--

Release fraction to air from wide dispersive use (regional only): 0.01 Release fraction to soil from wide dispersive use (regional only): 0.00001 Release fraction to wastewater from wide dispersive use: 0.00001
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<p>Conditions and measures related to municipal sewage treatment plant</p> <p>Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day Estimated substance removal from wastewater via domestic sewage treatment is: 95.8 % Not applicable as there is no release to wastewater. The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 54000 kg / day</p>
<p>Conditions and measures related to external treatment of waste for disposal</p> <p>Combustion emissions considered in regional exposure assessment [ETW2] Combustion emissions limited by required exhaust emission controls [ETW1] External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3]</p>
<p>Conditions and measures related to external recovery of waste</p> <p>This substance is consumed during use and no waste of the substance is generated [ERW3]</p>
<p>Section 3 Exposure Estimation</p>
<p>3.1. Health</p> <p>The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.[G30]</p>
<p>3.2. Environment</p> <p>The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.[EE2]</p>
<p>Section 4 Guidance to check compliance with the Exposure Scenario</p>
<p>4.1. Health</p> <p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23]</p>
<p>4.2. Environment</p> <p>Further details on scaling and control technologies are provided in factsheet Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.</p>

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Safety Data Sheet

According to EC 1907/2006

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Substance/mixture name: **Crude Oil** Safety Data Sheet Number: **817750**

MARPOL Annex I Category Crude Oils REACH Registration Number: Exempt from REACH registration (Regulation EC 1907/2006)

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses Refinery Feed

Uses Advised Against Other uses are not recommended unless an assessment demonstrates potential exposures will be controlled.

1.3. Details of the supplier of the safety data sheet

Manufacturer/Supplier JET Tankstellen Deutschland GmbH
Caffamacherreihe 1
20355 Hamburg
Tel.: 040/ 63801- 0
Fax.: 040/ 63801- 565
URL: www.Phillips66.com
Email: ESDS@P66.com

SDS Information

1.4. Emergency telephone number

BBGes Berlin: 030-19240 (24 Hours)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

CLP Classification (EC No 1272/2008)

H224 -- Flammable liquids -- Category 1

H304 -- Aspiration Hazard -- Category 1

H319 -- Eye damage/irritation -- Category 2

H336 -- Specific target organ toxicity (single exposure) -- Category 3

H350 -- Carcinogenicity -- Category 1B

H373 -- Specific target organ toxicity (repeated exposure) -- Category 2

H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2

2.2. Label elements



DANGER

**Extremely flammable liquid and vapor May be fatal if swallowed and enters airways Causes serious eye irritation
May cause drowsiness or dizziness May cause cancer May cause damage to organs through prolonged or repeated
exposure Repeated exposure may cause skin dryness or cracking Toxic to aquatic life with long lasting effects**

P201 - Obtain special instructions before use
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P273 - Avoid release to the environment
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331 - Do NOT induce vomiting

2.3. Other hazards

May contain or release poisonous hydrogen sulfide gas.
Does not meet the criteria for persistent, bioaccumulative and toxic (PBT) or very persistent, very bioaccumulative (vPvB) substances.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical Name	CASRN	EINECS	REACH Registration No.	Concentration ¹	CLP Classification ²
Crude Oil (Petroleum)	8002-05-9	232-298-5	Not applicable	100	H350
Naphthalene	91-20-3	202-049-5	Not applicable	0-0.9	H351,H302,H410
Benzene	71-43-2	200-753-7	01-2119447106-44	<1	H225,H350,H340,H372,H304,H319,H315
Hydrogen sulfide	7783-06-4	231-977-3	Not applicable	<1	H220,H330,H400

¹ All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

² Regulation EC 1272/2008.

Total Sulfur: 0.1 - 4.5wt%

Crude oil, natural gas and natural gas condensate can contain minor amounts of sulfur, nitrogen and oxygen containing organic compounds as well as trace amounts of heavy metals like mercury, arsenic, nickel, and vanadium. Composition can vary depending on the source of crude.

SECTION 4: First aid measures

4.1. Description of first aid measures

Eye Contact: For direct contact, remove contact lenses if present and easy to do. Immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 20 minutes. Seek immediate medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation: If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion: Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Effects of overexposure may include irritation of the digestive tract irritation of the respiratory tract nausea vomiting diarrhea and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue) Dry skin and possible irritation with repeated or prolonged exposure.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. Amyl nitrite inhalers (found in the cyanide antidote kit) can be used for 30 seconds every minute until an I.V line is established. For adults the dose is 10 mL of a 3% NaNO₂ solution (0.5 gm NaNO₂ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

5.2. Special hazards arising from the substance or mixture

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

5.3. Special protective actions for fire-fighters

For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Extremely flammable. May contain or release poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H₂S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

6.2. Environmental precautions

Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard.

6.3. Methods and material for containment and cleaning up

Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. May contain or release dangerous levels of hydrogen sulfide. Do not breathe vapors or mists. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Mercury and other heavy metals may be present in trace quantities in crude oil, raw natural gas, and condensates. Production and processing of these materials can lead to "drop-out" of elemental mercury in enclosed vessels and pipe work, typically at the low point of any process equipment because of its density. Mercury may also occur in other process system deposits such as sludges, sands, scales, waxes, and filter media. Personnel engaged in work with equipment where mercury deposits might occur (confined space entry, sampling, opening drain valves, draining process lines, etc), may be exposed to a mercury hazard (see sections 3 and 8). The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes for specific bonding/grounding requirements). Do not enter confined spaces such as tanks or pits without following proper entry procedures.

7.2. Conditions for safe storage, including any incompatibilities

Keep container(s) tightly closed and properly labeled. This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H2S, and flammability prior to entry. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to appropriate guidance pertaining to cleaning, repairing, welding, or other contemplated operations. Outdoor or detached storage is preferred. Indoor storage should meet Country or Committee standards and appropriate fire codes.

7.3. Specific end use(s)

Refer to supplemental exposure scenarios if attached.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limits			
Chemical Name	ACGIH	TRGS	Other
Crude Oil (Petroleum)	---	---	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (Phillips 66 Guidelines)
Naphthalene	TWA: 10 ppm Skin	TWA: 0.1 ppm TWA: 0.5 mg/m ³ Skin	---
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	---	---
Hydrogen sulfide	STEL: 5 ppm TWA: 1 ppm	TWA: 5 ppm TWA: 7.1 mg/m ³	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (Phillips 66 Guidelines)

STEL = Short Term Exposure Limit (15 minutes); TWA = Time Weighted Average (8 hours); --- = No Occupational Exposure Limit

Biological Limit Values			
Chemical Name	ACGIH	EU 98/24/EC	TRGS 903
Naphthalene	1-Naphthol with hydrolysis plus 2-Naphthol with hydrolysis in : , end of shift (nonquantitative, nonspecific)	---	---

Benzene	S-Phenylmercapturic acid in urine: 25 µg/g creatinine, end of shift (background) t,t-Muconic acid in urine: 500 µg/g creatinine, end of shift (background)	---	---
---------	---	-----	-----

Relevant DNEL and PNEC: Not applicable

8.2. Exposure controls

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds EN 166 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure to hydrogen sulfide (H₂S) above exposure limits, an approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used. Under conditions where hydrogen sulfide (H₂S) is NOT detected, an approved air purifying respirator equipped with Type A, organic gases and vapour filters (as specified by the manufacturer) may be used.

A respiratory protection program that follows recommendations for the selection, use, care and maintenance of respiratory protective devices in EN 529:2005 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health.

Workplace monitoring plans should consider the possibility that heavy metals such as mercury may concentrate in processing vessels and equipment presenting the possibility of exposure during various sampling and maintenance operations. Implement appropriate respiratory protection and the use of other protective equipment as dictated by monitoring results (See Sections 2 and 7).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Environmental Exposure Controls: Refer to Sections 6, 7, 12 and 13.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Data represent typical values and are not intended to be specifications. N/A = Not Applicable; N/D = Not Determined

Appearance:	Amber to Black
Physical Form:	Liquid
Odour:	Petroleum Rotten egg / sulfurous
Odour Threshold:	N/D
pH:	Not applicable
Melting/Freezing Point:	N/D
Initial Boiling Point/Range:	-89 to 538 °C
Flash Point:	< -7 °C

Evaporation Rate (nBuAc=1):	N/D
Flammability (solid, gas):	N/A
Upper Explosive Limits (vol % in air):	6.0
Lower Explosive Limits (vol % in air):	1.1
Vapour Pressure:	N/D
Relative Vapour Density (air=1):	N/D
Relative Density (water=1):	0.7 - 1.1
Solubility (ies):	N/D
Partition Coefficient (n-octanol/water) (Kow):	N/D
Auto-ignition Temperature:	310 °C
Decomposition Temperature:	N/D
Viscosity:	N/D
Explosive Properties:	N/D
Oxidising Properties:	N/D

9.2. Other information

Pour Point: N/D

SECTION 10: Stability and reactivity

10.1. Reactivity	Not chemically reactive.
10.2. Chemical stability	Stable under normal ambient and anticipated conditions of use.
10.3. Possibility of hazardous reactions	Hazardous reactions not anticipated.
10.4. Conditions to avoid	Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.
10.5. Incompatible materials	Avoid contact with strong oxidizing agents and strong reducing agents.
10.6. Hazardous decomposition products	Not anticipated under normal conditions of use.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Expected to have a low degree of toxicity by inhalation	May contain or release poisonous hydrogen sulfide gas - see Other Comments.	>5 mg/L (vapor) (rat)
Dermal	Unlikely to be harmful		>2 g/kg (rabbit)
Oral	Unlikely to be harmful		>5 g/kg (rat)

Aspiration Hazard: May be fatal if swallowed and enters airways.

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes serious eye irritation.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure. Laboratory animal studies of crude oil by the dermal and inhalation exposure routes have demonstrated toxicity to the liver, blood, spleen and thymus.

Carcinogenicity: May cause cancer. Chronic application of crude oil to mouse skin resulted in an increased incidence of skin tumors. IARC concluded in its Crude Oil Monograph that there is limited evidence of carcinogenicity in animals, and that crude oil is not classifiable as to its carcinogenicity in humans (Group 3). It has not been listed as a carcinogen by NTP or OSHA.

Germ Cell Mutagenicity: Inadequate information available.

Reproductive Toxicity: Inadequate information available. Dermal exposure to crude oil during pregnancy resulted in limited evidence of developmental toxicity in laboratory animals. Decreased fetal weight and increased resorptions were noted at maternally toxic doses. No significant effects on pup growth or other developmental landmarks were observed postnatally.

Other Comments: This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

This material may contain varying concentrations of polycyclic aromatic hydrocarbons (PAHs) which have been known to produce a phototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure is discontinued. Continued exposure to sunlight can result in more serious skin problems including pigmentation (discoloration), skin eruptions (pimples), and possible skin cancers. **Information on Toxicological Effects of Components**

Naphthalene

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The US National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has been identified as a carcinogen by IARC and NTP.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organ(s): Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

SECTION 12: Ecological information

12.1. Toxicity

Experimental studies of acute aquatic toxicity show values for crude oil in the range of 2 to over 100 mg/L. These values are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions. Crude oil should be regarded as harmful to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment.

12.2. Persistence and degradability

Most crude oils are not regarded as readily biodegradable. Most of the non-volatile constituents are inherently biodegradable; some of the highest molecular weight components are persistent in water.

Persistence per IOPC Fund definition: Persistent

12.3. Bioaccumulative potential

Log Kow values measured for the hydrocarbon components of this material range from less than 2 to greater than 6, and therefore would be regarded as having the potential to bioaccumulate.

12.4. Mobility in soil

Crude oil spreads as a film on the surface of water, facilitating loss of its lighter components by volatilization. In air, the volatile hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half-lives varying from 0.5 days for n-dodecane to 6.5 days for benzene. The lower molecular weight aromatic hydrocarbons and some polar compounds have low but significant water solubility. Some higher molecular weight compounds are removed by emulsification and these also slowly biodegrade; others adsorb to sediment and sink. A further removal process from water involving the heavier fraction is agglomeration to form tars, some of which sink.

12.5. Results of PBT and vPvB assessment

Not a PBT or vPvB substance.

12.6. Other adverse effects

None anticipated.

German Water Hazard Information: hazard class 1 - low hazard to waters

SECTION 13: Disposal considerations

13.1. Waste treatment methods

European Waste Code: 13 08 99* (oil) wastes not otherwise specified or 05 01 05* Oil spills

This material, if discarded as produced, would be considered as hazardous waste pursuant to Directive 2008/98/EC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.

This code has been assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste generators/producers are responsible for assessing the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code.

Empty Containers: Container contents should be completely used and containers emptied prior to discard. Empty drums should be properly sealed and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with applicable regulations.

SECTION 14: Transport information

14.1. UN number	UN1267
14.2. UN proper shipping name	PETROLEUM CRUDE OIL
14.3. Transport hazard class(es)	3
14.4. Packing group	I, II, or III
14.5. Environmental hazards	Marine pollutant - Environmentally Hazardous

14.6. Special precautions for user

If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EC 1272/2008 - Classification, labelling and packaging of substances and mixtures
EN166:2002 Eye Protection
EN 529:2005 Respiratory Protective devices
BS EN 374-1:2003 Protective gloves against chemicals and micro-organisms
Occupational Exposure Limits, Technical Rules for Dangerous Substances
Federal Water Act on the Classification of Substances Hazardous to Waters
Directive 2008/98/EC (Waste Framework Directive)
Directive 2000/76/EC on incineration of waste
Directive 1999/31/EC on landfill of waste

Export Rating: NLR (No License Required)

15.2. Chemical safety assessment

A chemical safety assessment has not been carried out for the substance/mixture.

SECTION 16: Other information



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10/10

Issue Date: 05-Aug-2015
Status: FINAL
Previous Issue Date: 30-Aug-2012
Revised Sections or Basis for Revision: Periodic review and update
Precautionary Statement(s) (Section 2)
Safety Data Sheet Number: 817750
Language: English

List of Relevant Hazard Statements:

H220: Extremely flammable gas
H224: Extremely flammable liquid and vapour
H225: Highly flammable liquid and vapour
H302: Harmful if swallowed
H304: May be fatal if swallowed and enters airways
H315: Causes skin irritation
H319: Causes serious eye irritation
H330: Fatal if inhaled
H336: May cause drowsiness or dizziness
H340: May cause genetic defects
H350: May cause cancer
H351: Suspected of causing cancer
H372: Causes damage to organs through prolonged or repeated exposure
H373: May cause damage to organs through prolonged or repeated exposure
H400: Very toxic to aquatic life
H410: Very toxic to aquatic life with long lasting effects
H411: Toxic to aquatic life with long lasting effects
EUH066 - Repeated exposure may cause skin dryness or cracking

Regulatory Basis of Classification

	Regulatory Basis
CLP Classification (EC No 1272/2008)	Regulatory Basis
H224 -- Flammable liquids -- Category 1	Based on component information.
H304 -- Aspiration Hazard -- Category 1	Based on component information.
H319 -- Eye damage/irritation -- Category 2	Based on component information.
H336 -- Specific target organ toxicity (single exposure) -- Category 3	Based on component information.
H350 -- Carcinogenicity -- Category 1B	Based on component information.
H373 -- Specific target organ toxicity (repeated exposure) -- Category 2	Based on component information.
H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2	Based on component information.

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; ADR = Agreement on Dangerous Goods by Road; BMGV = Biological Monitoring Guidance Value; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit; EINECS = European Inventory of Existing Commercial Chemical Substances; EPA = [US] Environmental Protection Agency; Germany-TRGS = Technical Rules for Dangerous Substances; IARC = International Agency for Research on Cancer; ICAO/IATA = International Civil Aviation Organization / International Air Transport Association; INSHT = National Institute for Health and Safety at Work; IMDG = International Maritime Dangerous Goods; Ireland-HSA = Ireland's National Health and Safety Authority; LEL = Lower Explosive Limit; MARPOL = Marine Pollution; N/A = Not Applicable; N/D = Not Determined; NTP = [US] National Toxicology Program; PBT = Persistent, Bioaccumulative and Toxic; RID = Regulations Concerning the International Transport of Dangerous Goods by Rail; STEL = Short Term Exposure Limit; TLV = Threshold Limit Value; TRGS 903 = Technical rules for hazardous substances; TWA = Time Weighted Average; UEL = Upper Explosive Limit; UK-EH40 = United Kingdom EH40/2005 OEL; vPvB = very Persistent, very Bioaccumulative

Disclaimer of Expressed and Implied Warranties:

The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared.

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GAS OILS (PETROLEUM), HEAVY

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MATERIAL SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

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**GAS OILS (PETROLEUM), HEAVY
ATMOSPHERIC**

Date of the previous version: not applicable Revision Date: 2011-09-28

Version 1

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**1.1. Product identifier**

Product name GAS OILS (PETROLEUM), HEAVY
REACH Registration Name ATMOSPHERIC
Gas oils (petroleum), heavy atmospheric.
REACH registration No: DE : 01-2119487927-16-0004
BE : 01-2119487927-16-0003
FR : 01-2119487927-16-0000
Pure substance/mixture Substance

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Manufacture of substance, Use as an intermediate, Distribution of substance, Formulation & (re)packing of substances and mixtures, Coating, Road and construction applications, Fuel used in combustion facilities, Diesel engines, etc. for the production of heat, electricity

..

1.3. Details of the supplier of the safety data sheet

Supplier TOTAL RAFFINAGE MARKETING
24, cours Michelet.

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GAS OILS (PETROLEUM), HEAVY

92800 PUTEAUX.

FRANCE

Tel: +33 (0)1 41 35 40 00

Fax: +33 (0)1 41 35 82 88

For further information, please contact

Contact Point HSE E-mail Address rm.mkefr-
fds@total.com

1.4. Emergency telephone number

+33 1 49 00 00 49 (24h/24, 7d/7)

In France : - PARIS : Hôpital Fernand Widal 200, rue du Faubourg Saint-Denis 75475 Paris Cédex 10 , Tel :
01.40.05.48.48. MARSEILLE : Hopital Salvator, 249 bd Ste Marguerite 13274 Marseille cedex 5, Tel : 04.91.75.25.25. -
LYON : Hopital Hédouard

Herriot, 5 place d'Arsonvil, 69437 Lyon cedex 3, Tel : 04.72.11.69.11. - NANCY : Hopital central, 29 Av du Mal De
Lattre de Tassigny, 54000 Nancy, Tel : 03.83.32.36.36 ou le SAMU : Tel (15)

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

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REGULATION (EC) No 1272/2008

For the full text of the H-Statements mentioned in this Section, see Section 2.2.

Acute inhalation toxicity - vapor - Category 4

Carcinogenicity - Category 1B

Reproductive toxicity - Category 2

Specific target organ systemic toxicity (repeated exposure) - Category 2

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Acute aquatic toxicity - Category 1

Chronic aquatic toxicity - Category 1

DIRECTIVE 67/548/EEC or 1999/45/EC*For the full text of the R-phrases mentioned in this Section, see Section 16***Classification**

Carc. cat. 2;R45 - Repr. cat. 3;R63 - Xn;R20 - Xn;R48/21 - R66 - N;R50-53

2.2. Label elements**Labelled according to:** REGULATION (EC) No 1272/2008**EC-No** 272-184-2**Signal Word**

DANGER

Hazard Statements

H350 - May cause cancer

H332 - Harmful if inhaled

H361d - Suspected of damaging the unborn child

H373 - May cause damage to organs through prolonged or repeated exposure in contact with skin

H410 - Very toxic to aquatic life with long lasting effects

ATMOSPHERIC**Revision Date:** 2011-09-28**Version 1****Precautionary Statements**

P201 - Obtain special instructions before use

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P260 - Do not breathe dust or mist

P281 - Use personal protective equipment as required

P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician

P331 - Do NOT induce vomiting

P501 - Dispose of contents/ container to an approved incineration plant.

P273 - Avoid release to the environment

Supplemental Hazard Statements

EUH066 - Repeated exposure may cause skin dryness or cracking

2.3. Other hazards

Physical-Chemical Properties In the presence of hot spots, there is a special risk of fire or explosion under certain conditions involving accidental release of vapor or leaks of product under pressure.

Properties Affecting Health

Contact with hot product will cause thermal burns.

Vapors or mists are irritating for mucous membranes, notably in the eyes.

Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations.

Environmental properties

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Chemical nature

A complex and variable combination of paraffinic, cyclic and aromatic hydrocarbons having a carbon number range predominantly of C7 to C35 and boiling in the range of approximately 121°C to 510°C. They may contain sulphurated derivatives and organic acids. This product contains polycyclic aromatic hydrocarbons (PAH), some of which are considered carcinogens.

Chemical Name	EC-No	REACH registration No:	CAS-No	Weight %	Classification (Dir. 67/548)	Classification (Reg. 1272/2008)



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GAS OILS (PETROLEUM), HEAVY

Gas oils (petroleum), heavy atmospheric	272-184-2	01-2119487927-16	68783-08-4	100	Xn;R20-48/21 Carc. cat. 2;R45 Repr. Cat. 3;R63 N;R50-53 R66	Carc. 1B (H350) Repr. 2 (H361d) Acute Tox. 4 (H332) STOT RE 2 (H373) Aquatic Acute 1 (H400) Aquatic chronic 1 (H410)
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Additional information

Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations
Note H

For the full text of the R-phrases mentioned in this Section, see Section 16 For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES**4.1. Description of first-aid measures****General advice**

IN CASE OF SERIOUS OR PERSISTENT CONDITIONS, CALL A DOCTOR OR EMERGENCY MEDICAL CARE.

If there is any suspicion of inhalation of H₂S. Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures.

Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If irritation, blurred vision or swelling occurs and persists. Obtain medical advice from a specialist.

In case of contact with the hot product, COOL THE EYE IMMEDIATELY AND COPIOUSLY WITH COLD WATER for 10 minutes, keeping the eye open if possible. Take the person to a specialised medical centre.

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Skin contact**GAS OILS (PETROLEUM), HEAVY**

Immediately remove all stained or splashed clothing that is not adhering to the skin. Remove as much as possible by wiping. If necessary, use a fatty substance of animal or vegetable origin. Never use gasoline, kerosene or other solvents for washing of contaminated skin. Wash affected area with soap and water. Seek medical attention if skin irritation, swelling or redness develops and persists.

When using high-pressure equipment, injection of product can occur. If high-pressure injuries occur, immediately seek professional medical attention.

For minor thermal burns. Hold the burned area under cold running water for at least five minutes, or until the pain subsides. Do not puncture blisters. DO NOT attempt to remove portions of clothing glued to burnt skin but cut round them.

Seek medical attention in all cases of serious burns. In this case, the casualty should be sent immediately to hospital.

ATMOSPHERIC**Revision Date:** 2011-09-28**Version** 1**Inhalation**

In case of exposure to intense concentrations of vapours, fumes or spray, transport the person away from the contaminated zone, keep warm and allow to rest.

Immediately begin artificial respiration if breathing has ceased. Call a physician immediately.

If there is any suspicion of inhalation of H₂S. Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures. If not breathing, give artificial respiration. Provision of oxygen may help. Remove casualty to fresh air as quickly as possible.

Ingestion**Protection of First-aiders**

Do NOT induce vomiting. Give nothing to drink. Never give anything by mouth to an unconscious person.

Consult a physician.

CAUTION! First aid personnel must be aware of personal risk during rescue!

Use personal protective equipment. See Section 8 for more detail.

4.2. Most important symptoms and effects, both acute and delayed

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GAS OILS (PETROLEUM), HEAVY

Eye contact

Vapor may cause irritation. Risk of burns (if the product is hot).

Skin contact

Prolonged or repeated contact may dry skin and cause irritation. Risk of burns (if the product is hot).

Inhalation

Inhalation of vapors in high concentration may cause irritation of respiratory system. Causes headache, drowsiness or other effects to the central nervous system. Risk of hydrogen sulphide intoxication (H₂S). few or no symptoms expected. If any, nausea and diarrhoea might occur.

Ingestion**4.3. Indication of immediate medical attention and special treatment needed, if necessary****Notes to physician**

Treat symptomatically

5. FIRE-FIGHTING MEASURES**5.1. Extinguishing media****Suitable Extinguishing Media**

Extinguishing media - large fires: Foam (specifically trained person only).

Water fog (trained personnel only).

Extinguishing media - small fires: Carbon dioxide (CO₂). Dry powder. Sand or earth.

Other inert gases (subject to regulations).

Unsuitable Extinguishing Media

Do not use direct water jets on the burning product. they could cause splattering and spread the fire.

Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

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5.2. Special hazards arising from the substance or mixture**Special Hazard**

Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates, gases, including carbon monoxide, unidentified organic and inorganic compounds.

If sulphur compounds are present in appreciable amounts, combustion products may include also H₂S and SO_x (sulfur oxides) or sulfuric acid.

5.3. Advice for fire-fighters

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Special protective equipment for fire-fighters In case of a large fire or in confined or poorly ventilated spaces, wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Other information Do not allow run-off from fire fighting to enter drains or water courses.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

General Information

Except in case of small spillages, The feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency.

If required, notify relevant authorities according to all applicable regulations.

When the presence of dangerous amounts of H₂S around the spilled product is suspected or proved, additional or special actions may be warranted to determine controls appropriate to local circumstances.

Evacuate non-essential personnel. Avoid direct contact with released material. Stop or contain leak at the source, if safe to do so.

Avoid contact with skin, eyes and inhalation of vapors. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Ensure adequate ventilation, especially in confined areas.

For personal protection see section 8.

Advice for non-emergency personnel

Do not touch or walk through spilled material. Evacuate personnel to safe areas. Ensure adequate ventilation. For personal protection see section 8.

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Advice for emergency responders Ensure the application of strict rules of hygiene by the personnel exposed to the risk of contact with the product. Use personal protective equipment.

In case of:

Small spillages: normal antistatic working clothes are usually adequate. For personal protection see section 8.

Large spillages: full body suit of chemically resistant and antistatic material.
Work gloves

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(preferably gauntlets) providing adequate chemical resistance. Remarks: Gloves made of PVA are not water-resistant, and are not suitable for emergency use. If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated.

Work helmet. Antistatic non-skid safety shoes or boots. if necessary heat-resistant.

Goggles and/or face shield, if splashes or contact with eyes is possible or anticipated. Respiratory protection: A half or full-face respirator with filter(s) for organic vapours (and when applicable: for H₂S). If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used.

6.2. Environmental precautions

General Information

The product should not be allowed to enter drains, water courses or the soil. Solidified product may clog drains and sewers. If necessary, Consult an expert. Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and materials for containment and cleaning up

Methods for Containment

control the spreading of the spillage. Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13). Ensure adequate ventilation, especially in confined areas. Large spillages may be cautiously covered with foam, if available, to limit fire risk.

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Methods for cleaning up Let hot product cool down naturally. Collect free product with suitable means, Use mechanical means such as pumps, skimmers and absorbent materials. Pick up and transfer to properly labeled containers. Cleaning with high pressure washers. or. Wash off with warm water. Wear respiratory protection.

In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations. Transfer recovered product and

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other materials to suitable tanks or containers and store/dispose according to relevant regulations.

In case of spillage in the water:

Product less dense than water. In case of small spillages in closed waters . contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents, control the spreading of the spillage.

If possible, large spillages in open waters should be contained with floating barriers or other mechanical means. collect the product by skimming or other suitable mechanical means. The use of dispersants should be advised by an expert, and, if required, approved by local authorities. Collect recovered product and other materials in suitable tanks or containers for recovery or safe disposal.

If possible, collect the product and contaminated materials with mechanical means, and store/dispose of according to relevant regulations. In special situations (to be assessed on case-by case basis, according to expert judgement and local conditions), excavations of trenches on the bottom to collect the product, or burying the product with sand may be a feasible option.

6.4. Reference to other sections

Personal Protective Equipment See Section 8 for more detail

Waste treatment See section 13

Other information Recommended measures are based on the most likely spillage scenarios for this material. However, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary. Local regulations may also prescribe or limit actions to be taken. Cut off the electric power supply if this operation causes no sparks in the area containing vapors from the product.

Concentration of H₂S in tank headspaces may reach hazardous values, especially in case of prolonged storage. This situation is especially relevant for those operations which involve direct exposure to the vapours in the tank. Spillages of limited amounts of products, especially in the open air when

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vapours will be usually quickly dispersed, are dynamic situations, which presumably do not entail exposure to dangerous concentrations. As H₂S has a density greater than ambient air, a possible exception may regard the build-up of dangerous concentrations in specific spots, like trenches, depressions or confined spaces. In all these circumstances, however, the correct actions should be assessed on a case-by-case basis.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

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Advice on safe handling Handle in accordance with good industrial hygiene and safety practice.

Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations. Wear personal protective equipment. Refer to Section 8.

Take precautionary measures against static electricity.

The inspection, cleaning and maintenance of storage containers require the application of strict procedures and must be entrusted to qualified personnel (internal or external). Avoid splash filling of bulk volumes when handling hot liquid product. Keep the temperature of the product as low as possible to minimise the release of fumes. Never check the tank level by using a naked flame.

Do not smoke. Avoid breathing vapors or mists. Ensure adequate ventilation. Vapors may form explosive mixtures with air.

Avoid contact with skin, eyes and clothing. Wear suitable protective clothing. Do not use compressed air for filling, discharging, or handling operations.

Technical measures Prevent the formation of vapors, mists and aerosols. Ensure adequate ventilation.

Do not use compressed air for filling, discharging, or handling operations.

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Design installations to avoid spills and splashes of hot product. Take all necessary precautions to prevent water from entering the containers, tanks, transfer lines etc... Keep away from food, drink and animal feedingstuffs.

Prevention of fire and explosion NEVER heat a reservoir or tank if the heating elements are not adequately immersed (minimum 15 cm).

Take precautionary measures against static discharges. Ground/bond containers, tanks and transfer/receiving equipment. Never weld any container or empty pipe that has not been degassed.

Do not heat the pumps or pipes using an open flame.

Hygiene measures

Ensure the application of strict rules of hygiene by the personnel exposed to the risk of contact with the product. Avoid contact with skin, eyes and clothing. Use personal protective equipment as required.

Remove as much as possible by wiping. If small amount of product only comes into contact with the skin, remove with vegetable oil. White oil, lukewarm paraffin or a suitable soap recommended for this purpose may also be used.

Do not use abrasives, solvents or fuels.

Do not put product contaminated rags into workwear pockets.

Do not eat, drink or smoke when using this product. Change contaminated clothes at the end of working shift. Wash hands before breaks and immediately after handling the product. Gloves must be periodically inspected and changed in case of wear, perforations or contaminations. Avoid breathing vapors, mist or gas.

7.2. Conditions for safe storage, including any incompatibilities

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**Technical
measures/Storage
conditions**

**Materials to Avoid
Packaging material**

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Further information

7.3. Specific end uses

Storage area layout, tank design, equipment and operating procedures must comply with the relevant European, national or local legislation.

Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulphide (H₂S) and flammability. If sulphur compounds are suspected to be present in the product, check the atmosphere for H₂S content. Use adequate personal protective equipment as needed.

Take precautionary measures against static discharges. Ensure all equipment is electrically grounded before beginning transfer operations. Storage installations should be designed with adequate bunds so as to prevent ground or water pollution in case of leaks or spills. Do not remove the hazard labels of the containers

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(even if they are empty). Store the packed products (drums, samples, cans ...) in properly ventilated rooms, away from damp, heat and any potential source of ignition. Lines used for the product and pump devices are to be insulated and equipped with a heating device.

Keep containers tightly closed and properly labelled. Keep preferably in the original container. Otherwise reproduce all indication of the regulation label on the new container.

Store separately from oxidising agents.

Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned. Empty containers may contain combustible product residues. Store in accordance with the particular national regulations.

Strong oxidizing agents. Strong acids. Halogens.

Use only containers, seals, pipes, etc... made in a material suitable for use with aromatic hydrocarbons. heat resistant. Recommended materials for containers, or container linings use mild steel, stainless steel. Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.

Ensure that all relevant regulations regarding handling and storage facilities of flammable products are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits Hydrogen sulphide (EU): OEL = 7 mg/m³, 5ppm (8 h), 14 mg/m³, 10ppm (short-time)

Other constituents required for disclosure

Legend See section 16

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Chemical Name	Short term, systemic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Gas oils (petroleum), heavy atmospheric 68783-08-4	4700 mg/m ³ /15min (aerosol - inhalation)		0.12 mg/m ³ /8h (aerosol inhalation)	0.065 mg/kg/8h (dermal)
Chemical Name	Short term, systemic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Gas oils (petroleum), heavy atmospheric 68783-08-4			0.015 mg/kg/24h (oral)	

8.2. Exposure controls

Occupational Exposure Controls

Engineering Measures

Ensure adequate ventilation. Do not enter empty storage tanks until measurements of available oxygen have been carried out. When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.

Personal Protective Equipment

General Information

Protective engineering solutions should be implemented and in use before personal protective equipment is considered.
 Use personal protective equipment in good condition.

Respiratory protection

For rescue and maintenance work in storage tanks use self-contained breathing apparatus. The use of breathing apparatus must comply strictly with the manufacturer's instructions and the regulations governing their choices and uses.
 Maintain adequate ventilation. Do not breathe vapors, mist or gas.
 In an emergency or for exceptional short-lasting jobs in an atmosphere polluted by the product, it is necessary to wear protective respiratory equipment.
 Approved respiratory protection equipment shall be used in spaces where hydrogen sulphide may accumulate: full face mask with cartridge/filter type

“B” (grey for inorganic vapours including H₂S) or self-contained breathing apparatus (SCBA). (EN 529).

Eye Protection	Work helmet with neck cloth. Tightly fitting safety goggles. or. Face-shield.
Skin and body protection	Wear single use overwall. Hydrocarbon resistant clothing. Protective shoes or boots. Rubber or plastic boots. Coverall (with trousers legs over boots).
Hand Protection	Hydrocarbon-proof gloves. Nitrile rubber. Neoprene gloves. Wear suitable gloves tested to EN374. Gloves anti-heat for the liquefied product (EN 407, level 1).

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Environmental exposure controls

General Information The product should not be allowed to enter drains, water courses or the soil

9. PHYSICAL AND CHEMICAL PROPERTIES
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9.1. Information on basic physical and chemical properties

Appearance	viscous
Color	yellow To brown
Physical State @20°C	Viscous
Odor	Hydrocarbon-like

<u>Property</u>	<u>Values</u>	<u>Remarks</u>	<u>Method</u>
pH		Not applicable	
Boiling point/boiling range	180 - 380 °C 356 - 716 °F		EN 15199 EN 15199
Flash point	> 66 - °C > 151 - 340 °F		ISO 2719 ISO 2719.
Evaporation rate		No information available	
Flammability Limits in Air upper Lower	5 % 0.5 %		
Vapor Pressure	< 1 kPa @ 150 °C		EN 13016-1
Vapor density	> 5	@ 15 °C	
Density	900 - kg/m ³	Not applicable	
Water solubility		No information available	ISO 12185
Solubility in other solvents		No information available	
logPow			
Autoignition temperature	> 250 °C > 482 °F	@ 100 °C	DIN 51794 DIN 51794
Viscosity, kinematic	6 - 12 mm ² /s		ISO 3104
Viscosity, dynamic			
Explosive properties	Not considered explosive based on chemical structure and oxygen balance considerations		

Oxidizing Properties This product is not considered oxidising based on chemical structure considerations

Possibility of hazardous reactions None under normal processing

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9.2. Other information

Flow point		
Pour point	< 45 °C	ISO 3016

10. STABILITY AND REACTIVITY

10.1. Reactivity

General Information No information available.

10.2. Chemical stability

Stability Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous Reactions None under normal processing.

10.4. Conditions to Avoid

Conditions to Avoid Take precautionary measures against static discharges. Keep away from open flames, hot surfaces and sources of ignition.

10.5. Incompatible Materials

Materials to Avoid Strong oxidizing agents. Strong acids. Halogens.

10.6. Hazardous Decomposition Products

Hazardous Decomposition Products None under normal use.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity Local effects Product Information

General Information The acute toxicity has been adequately characterised in a large number of GLP-compliant guideline investigations following oral, dermal or inhalation exposure. Findings from an acute inhalation study support classification.

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Skin contact Samples of the substance have been tested in skin irritation studies. There was no evidence of skin corrosion. This substance does not meet the EU criteria for classification. Prolonged or repeated contact may dry skin and cause irritation. Risk of burns (if the product is hot).

Eye contact
Inhalation None of the samples tested showed more than minimal redness and swelling, which resolved quickly. This substance does not meet the EU criteria for classification. Vapor may cause irritation. Risk of burns (if the product is hot).

Inhalation of vapors in high concentration may cause irritation of respiratory system. Causes headache, drowsiness or other effects to the central nervous system. Risk of hydrogen sulphide intoxication (H2S).

Ingestion few or no symptoms expected. If any, nausea and diarrhoea might occur.

Acute toxicity Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Gas oils (petroleum), heavy atmospheric	LD50 > 5000 mg/kg bw (rat OECD 401)	LD50 > 2000 mg/kg bw (rabbit OECD 434)	CL50 (4h) 4.1 mg/l (males) 4.3 mg/l (females) (aerosol - rat)

Sensitization

Sensitization

There are no reports available to indicate that the substance has the potential to cause skin and respiratory sensitisation.

Specific effects

Carcinogenicity

Positive results obtained from mouse skin painting studies and from an initiation/promotion assay indicate that these components are carcinogenic.

Chemical Name	European Union
Gas oils (petroleum), heavy atmospheric 68783-08-4	Carc. 1B (H350)

Mutagenicity

The mutagenic potential of the substance has been extensively studied in a range of in-vivo and in-vitro assays. The majority of the studies showed no evidence of mutagenic activity.

Germ Cell Mutagenicity

The weight of evidence from in vivo and in vitro mutagenic studies indicates that this substance does not meet the criteria for classification under regulation.

Reproductive toxicity

These components do not specifically target the reproductive system on male and female rats.

Developmental Toxicity

The available data indicate that these components adversely affect foetal development.

Chemical Name	European Union
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Repeated Dose Toxicity

817750 - Crude Oil

Page

Target Organ Effects (STOT)

Status: FINAL

**Specific target organ
systemic toxicity (single
exposure)**

Acute exposure studies show no evidence of systemic toxicity.

**Specific target organ
systemic toxicity (repeated
exposure)**

Repeated exposure may cause skin dryness or cracking. There is evidence to indicate that these components have a potential to cause systemic alterations following repeated dermal exposure.

Other information**Other information** Not relevant.**12. ECOLOGICAL INFORMATION**

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12.1. Toxicity

Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Acute aquatic toxicity Product Information**Acute aquatic toxicity Component Information**

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to microorganisms
Gas oils (petroleum), heavy atmospheric 68783-08-4	EL50 (72h) 0.75 mg/l (Pseudokirchnerella subcapitata - QSAR Petrotox)	EL50 (48h) 2 mg/l (Daphnia magna - OECD 202)	LL50 (96h) 79 mg/l (Oncorhynchus mykiss OECD 203)	

Chronic aquatic toxicity Product Information**Chronic aquatic toxicity Component Information**

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to microorganisms
Gas oils (petroleum), heavy atmospheric 68783-08-4		NOEL (21d) 0.27 mg/l (Daphnia magna - QSAR Petrotox)	NOEL (14/28d) 0.1 mg/l (Oncorhynchus mykiss - QSAR Petrotox)	

Effects on terrestrial organisms**ATMOSPHERIC**

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No information available.

12.2. Persistence and degradability

General Information

Substance is a UVCB. Standard tests for this endpoint are not appropriate.

12.3. Bioaccumulative potential

Product Information

Substance is a UVCB. Standard tests for this endpoint are not appropriate.

logPow

No information available

Component Information

No information available.

12.4. Mobility in soil

Mobility				
Method	Compartment	Result	(%)	Remarks
Percent distribution in media (Calculation according to Mackay, Level III)	Soil		67.81	
Percent distribution in media (Calculation according to Mackay, Level III)	Sediment		27.63	
Percent distribution in media (Calculation according to Mackay, Level III)	Air		4.55	
Percent distribution in media (Calculation according to Mackay, Level III)	Water		0.01	

Soil

Given its physical and chemical characteristics, the product generally shows low soil mobility.

Air

Loss by evaporation is limited.

Water

The product floats or settles, depending on its density.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment

Anthracene is not present in this substance at greater than 0.1% (CONCAWE 2010). No other representative hydrocarbon structure were found to meet the PBT/vPvB criteria. This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

12.6. Other adverse effects

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General

Information No information available.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues /

Unused Products

Contaminated packaging

Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of contents/container to an approved incineration plant.

Empty containers should be taken to an approved waste handling site for recycling or disposal.

EWC Waste Disposal No.

According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used.

14. TRANSPORT INFORMATION

ADR/RID

UN/ID No UN1202

Proper shipping name DIESEL FUEL

Proper shipping name GAS OIL

Hazard class 3

Packing Group III

ADR/RID-Labels 3

Environmental hazard Yes

Classification Code F1

Special Provisions 640L

Tunnel Restriction Code (D/E)

ADR Hazard Id (Kemmler 30

Number)

Description UN1202, DIESEL FUEL, 3, PG III, (D/E)

Excepted Quantity E1

Limited quantity 5L

IMDG/IMO

UN/ID No	UN1202
Proper shipping name	DIESEL FUEL
Hazard class	3
Packing Group	III
Marine Pollutant	P

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EmS No.	F-E, S-E
Description	UN1202, DIESEL FUEL, 3, PG III, (55°C c.c.)
Excepted Quantity	E1
Limited quantity	5L

ICAO/IATA

UN/ID No	UN1202
Proper shipping name	DIESEL FUEL
Hazard class	3
Packing Group	III
ERG Code	3L
Special Provisions	A3
Description	UN1202, DIESEL FUEL, 3, PG III
Excepted Quantity	E1
Limited quantity	10L

ADN

UN/ID No	UN1202
Proper shipping name	DIESEL FUEL
Proper shipping name	GAS OIL
Hazard class	3
Hazard Labels	3
Packing Group	III

Environmental hazard	Yes
Classification Code	F1
Special Provisions	274, 560
Description	UN1202, DIESEL FUEL, 3, PG III
Excepted Quantity	E1
Limited quantity	EL
Ventilation	VE01

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

European Union

REACH

This substance has been registered according to Regulation (EU) No. 1907/2006 (REACH).

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International Inventories

EINECS/ELINCS	Complies
TSCA	Complies
DSL	Complies
ENCS	-
IECSC	-
KECL	Complies
PICCS	-
AICS	Complies
NZIoC	-

Legend

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

Further information

15.2. Chemical Safety Assessment

16. OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3

- R45 - May cause cancer
- R63 - Possible risk of harm to the unborn child
- R20 - Harmful by inhalation
- R66 - Repeated exposure may cause skin dryness or cracking
- R48/21 - Harmful: danger of serious damage to health by prolonged exposure in contact with skin
- R50/53 - Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Full text of H-Statements referred to under section 2 and 3

- H350 - May cause cancer in contact with skin
- H361d - Suspected of damaging the unborn child
- H332 - Harmful if inhaled
- H373 - May cause damage to organs through prolonged or repeated exposure in contact with skin
- H400 - Very toxic to aquatic life
- H410 - Very toxic to aquatic life with long lasting effects

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Abbreviations, acronyms

Legend Section 8

+	Sensitizer	*	Skin designation
**	Hazard Designation	C:	Carcinogen
M:	Mutagen	R:	Toxic to reproduction

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Revision Note (M)SDS sections updated: 1, 2, 3, 15.

Further information Note H: The classification and label shown for this substance applies to the hazard or hazards indicated by the hazard statement or hazard statements in

combination with the hazard classification shown. The requirements of Article 4 of Regulation (EC) No

1272/2008 on suppliers of this substance apply to all other hazard classes, differentiations and categories. The final label shall follow the requirements of section 1.2 of Annex I to Regulation (EC) No 1272/2008

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

This safety data sheet serves to complete but not to replace the technical product sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfil his obligations. This list is not to be considered complete and exhaustive. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.

End of the safety data sheet